Commonwealth of Pennsylvania

DEPARTMENT OF AGRICULTURE

BULLETIN No. 193

PROCEEDINGS OF THE THIRTY-THIRD ANNUAL MEETING

OF THE

Pennsylvania State Board of Agriculture

HELD IN THE

HOUSE OF REPRESENTATIVES CAUCUS ROOM,
CAPITOL BUILDING, HARRISBURG, PA.

January 26 and 27, 1910

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1910.

VIRTUE
LIBERTY AND
INDEPENDENCE

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MEMBERS

OF THE

PENNSYLVANIA STATE BOARD OF AGRICULTURE,

FOR THE YEAR 1910.

MEMBERS EX-OFFICIO.

HON. EDWIN S. STUART, Governor.
HON. HENRY HOUCK, Secretary of Internal Affairs.
DR. N. C. SCHAEFFER, Superintendent of Public Instruction.
DR. EDWIN EARLE SPARKS, President of the State College.
HON. A. E. SISSON, Auditor General.
HON. N. B. CRITCHFIELD, Secretary of Agriculture.

APPOINTED BY THE GOVERNOR.

R. I. Young, Middletown, Dauphin County, ...Term expires 1911
R. H. Thomas, Jr., Mechanicsburg, Cumberland County, ...Term expires 1912
Gen. James A. Beaver, Bellefonte, Centre County, ...Term expires 1913

APPOINTED BY THE STATE POULTRY ASSOCIATION.

J. D. Nevius, ...Philadelphia, ...1910

APPOINTED BY THE PENNSYLVANIA BRANCH OF THE AMERICAN POULTRY ASSOCIATION.

W. Theo. Wittman, ...Allentown, ...1913

ELECTED BY COUNTY AGRICULTURAL SOCIETIES.

			Term expires.
Adams,	A. I. Weidner,	Arendtsville,	1912
Allegheny,	A. J. Purdy,	Imperial, R. F. D. No. 1,	1912
Armstrong,	S. S. Blyholder,	Neale,	1911
Beaver,	A. L. McKibben,	New Sheffield,	1911
Bedford,	David W. Lee,	Bedford,	1912
Berks,	H. G. McGowan,	Geiger's Mills,	1913
Blair,	Howard Cox,	Bellwood,	1911
Bradford,	F. D. Kerrick,	Towanda,	1913
Bucks,			
Butler,	N. F. Bartley,	Euclid,	1911
Cambria,	Jas. Westrick,	Patton, R. F. D. No. 2,	1913
Cameron,			
Carbon,			
Centre,	John A. Woodward,	Howard,	1912
Chester,	M. E. Conard,	Westgrove,	1912
Clarion,	J. H. Wilson,	Clarion,	1913
Clearfield,	Peter Gearhart,	Clearfield,	1913

			Term expires.
Clinton,	J. A. Herr,	Millhall, R. F. D.,	1911
Colnmbia,	A. P. Young,	Millville,	1912
Crawford,	J. F. Seavy,	Saegerstown,	1911
Cumberland,			
Dauphin,			
Delaware,	E. J. Durnall,	Swarthmore,	1911
Elk,	John M. Witman,	St. Mary's,	1911
Erie,			
Fayette.			
Forest,			
Franklin,	John P. Young,	Marion,	1911
Fulton,	J. L. Patterson,	MeConnellsburg,	1913
Greene,	N. M. Biddle,	Carmiehaels,	1913
Huntingdon,	Geo. G. Hutehison,	Warrior's Mark,	1912
Indiana,	S. E. George,	West Lebanon,	1913
Jefferson,	Peter B. Cowan,	Brookville,	1913
Juniata,	Matthew Rodgers,	Mexieo,	1912
Lackawanna,	Horace Seamans,	Faetoryville,	1913
Laneaster,			
Lawrenee,	Sylvester Shaffer,	New Castle,	1913
Lebanon,	H. C. Snavely,	Cleona,	1913
Lehigh,	P. S. Fenstermaker,	Allentown,	1912
Luzerne,			
Lyeoming,	A. J. Kahler,	Hughesville,	1912
MeKean,	O. W. Abbey,	Turtle Point,	1913
Mereer,	W. C. Blaek,	Mereer,	1911
Mifflin,	M. M. Naginey,	Milroy,	1913
Monroe,	F. S. Brong,	Saylorsburg,	1913
Montgomery,	J. Sexton,	North Wales,	1911
Montour,	J. Miles Derr,	Milton, R. F. D.,	1911
Northampton,	C. S. Messinger,	Tatamy,	1912
Northumberland,	I. A. Esehbaeh,	Milton, R. F. D.,	1911
Perry,	A. T. Holman,	Millerstown,	1913
Philadelphia,	David Rust,	Philadelphia,	1913
Pike,			
Potter,			
Sehuylkill,	John Shoener,	New Ringgold,	1913
Snyder,			
Somerset,	John C. Weller,	Roekwood,	1911
Sullivan,	E. R. Warburton,	Campbellsville,	1912
Susquehanna,	Frank A. Davies,	Montrose,	1913
Tioga,	E. B. Dorsett,	Mansfield,	1911
Union,	J. Newton Glover,	Vieksburg,	1911
Venango,			
Warren,	R. J. Weld,	Sugargrove,	1911
Washington,	D. S. Taylor,	Burgettstown,	1911
Wayne,	Warren E. Perham,	Pleasant Mount,	1911
Westmoreland,	M. P. Shoemaker,	Greensburg,	1913
Wyoming,	D. A. Knnppenbnrg,	Lake Carey,	1913
York,	G. F. Barnes,	Rossville,	1911

OFFICERS.

PRESIDENT.

Hon. Edwin S. Stuart, Governor, ... Harrisburg.

VICE PRESIDENTS.

John C. Weller, ... Rockwood.
H. C. Snavely, ... Cleona.
S. S. Blyholder, ... Neale.

EXECUTIVE COMMITTEE.

P. S. Fenstermaker, Chairman, ... Allentown.
Matthew Rodgers, ... Mexico.
A. J. Kahler, ... Hughesville.
D. A. Knuppenburg, ... Lake Carey.
A. T. Holman, ... Millerstown.
J. Newton Glover, ... Vicksburg.
M. P. Shoemaker, ... Greensburg.
H. G. McGowan, ... Geiger's Mills.
N. B. Critchfield, Secretary, ... Harrisburg.

ADVISORY COMMITTEE.

N. B. Critchfield, Secretary, ... Harrisburg.
A. J. Kahler, ... Hughesville.
H. G. McGowan, ... Geiger's Mills.
F. D. Kerrick, ... Towanda.

CONSULTING SPECIALISTS.

Botanist, ...Prof. W. A. Buckhout, ... State College.
Pomologist, ...Gabriel Hiester, ... Harrisburg.
Chemist, ...Dr. William Frear, ... State College.
Vet. Surgeon, ...Dr. S. H. Gilliland ..... Harrisburg.
Sanitarian, ...W. H. Banks, ... Mifflintown.
Microscopist and Hygienist...Dr. J. W. Kellogg, ... Harrisburg.
Entomologist, ...Prof. Franklin Menges, ... York.
Ornithologist, ...Prof. H. A. Surface, ... Harrisburg.
Meteorologist, ...E. R. Demain, ... Harrisburg.
Mineralogist, ...Baird Halberstadt, ... Pottsville.
Apiarist, ...H. C. Klinger, ... Liverpool.
Economic Geologist, ...Dr. Isaac A. Harvey, ... Lock Haven.
Agricultural Geologist, ...W. H. Stout, ... Pinegrove.
Forests and Forestry, ...Robert Conklin, ... Harrisburg.
Feeding Stuffs, ...G. G. Hutchison, ... Warrior's Mark.

STANDING COMMITTEES.

LEGISLATION.

Hon. H. G. McGowan, Chairman, ... Geiger's Mills.
Hon. A. J. Kahler, ... Hughesville.
Matthew Rodgers, ... Mexico.
S. S. Blyholder, ... Neale.
E. B. Dorsett, ... Mansfield.

CEREALS AND CEREAL CROPS.

J. Miles Derr, Chairman, ... Milton.

ROADS AND ROAD LAWS.

H. C. Snavely, Chairman, ... Cleona.

FRUIT AND FRUIT CULTURE.

D. A. Knuppenburg, Chairman, ... Lake Carey.

DAIRY AND DAIRY PRODUCTS.

Dr. M. E. Conard, Chairman, ... Westgrove.

FERTILIZERS.

A. T. Holman, Chairman, ... Millerstown.

WOOL AND TEXTILE FABRICS.

D. S. Taylor, Chairman, ... Burgettstown.

LIVESTOCK.

J. L. Patterson, Chairman, ... McConnellsburg.

POULTRY.

W. Theo. Wittman, Chairman, ... Allentown.

PROCEEDINGS OF THE THIRTY-THIRD ANNUAL MEETING OF THE STATE BOARD OF AGRICULTURE, HELD IN THE HOUSE OF REPRESENTATIVES CAUCUS ROOM, CAPITOL BUILDING, HARRISBURG, PA., JANUARY 26 AND 27, 1910.

Harrisburg, Pa., Wednesday, January 26, 1910, 9 A. M.

Vice-President J. A. Herr in the Chair.

The CHAIRMAN: The Board will please come to order. I am glad to see so many members of the Board here. There is a quorum present and we will proceed to business. The Secretary will call the roll

The SECRETARY: Mr. Chairman, owing to the fact that my voice is not in good condition I will ask the privilege of having my assistant call the roll. I wish to announce that the members of the Board that hold over, those whose terms expire in January, 1911 and 1912 only, will be called.

The roll of members was then called by the Secretary's assistant, and at this and subsequent roll calls the following persons answered:

Gen. James A. Beaver, R. I. Young, R. H. Thomas, Jr., A. J. Purdy, S. S. Blyholder, David W. Lee, H. G. McGowan, F. D. Kerrick, N. F. Bartley, Jas. Westrick, John A. Woodward, M. E. Conard, Peter Gearhart, J. A. Herr, A. P. Young, J. F. Seavy, E. J. Durnall, John M. Witman, John P. Young, J. L. Patterson, G. G. Hutchison, Peter B. Cowan, Matthew Rodgers, Horace Seamans, Sylvester Shaffer, H. C. Snavely, P. S. Fenstermaker, A. J. Kahler, O. W. Abbey, M. M. Naginey, Jason Sexton, J. Miles Derr, C. S. Messinger, I. A. Eschbach, A. T. Holman, John Shoener, John C. Weller, E. R. Warburton, E. B. Dorsett, J. Newton Glover, D. S. Taylor, Warren E. Perham, M. P. Shoemaker, D. A. Knuppenburg and G. F. Barnes.

Ex-Officio Members: Hon. Edwin S. Stuart, Governor; Dr. N. C. Schaeffer, Superintendent of Public Instruction; Dr. Edwin Earle Sparks, President of the State College, and Hon. N. B. Critchfield, Secretary of Agriculture.

The following Consulting Specialists were also in attendance. Gabriel Hiester, Pomologist; Dr. William Frear, Chemist; Prof. Franklin Menges, Entomologist; Prof. H. A. Surface, Ornithologist; Baird Halberstadt, Mineralogist; H. C. Klinger, Apiarist; Dr. Isaac A. Harvey and W. H. Stout, Geologists; Hon Robert Conklin, Forests and Forestry; G. G. Hutchison, Feeding Stuffs.

The CHAIRMAN: I will appoint the Committee on Credentials, as follows: Matthew Rodgers, of Juniata county; J. F. Seavy, of Crawford county; P. S. Fenstermaker, of Lehigh county; E. R. Warburton, of Sullivan county, and D. S. Taylor, of Washington county.

The SECRETARY: Mr. Chairman, I have the credentials in my hands. They will be placed in the hands of the Chairman of the Committee. Before that Committee retires, I wish to say that Mr. McClellan, from Clarion county, is present this morning for the reason that his successor did not come to the meeting. I am not sure that he will be able to serve on the Board at all. It will be, I suppose, a matter for the Committee on Credentials to determine whether Mr. McClellan shall remain a member of the Board until his successor is elected and we have notice of his election or until he qualifies. This is a new case entirely; one such as we have not had before. Now, if Clarion county desires representation upon the Board and the member-elect does not appear and does not care to take the place to which he has been elected, it is a question for us to settle whether Mr. McClellan shall still continue until his successor qualifies or not. What is the ruling of the Chair with regard to the matter? Is that a question for submission to the Committee on Credentials?

The CHAIRMAN: I think that should be ruled by the Chair. The credentials of the officers and members of this Board expire on the fourth Wednesday in January of each year, and if they fail to be re-elected I should think there was a vacancy in the office. I have not had any instance in my long membership in the Board in which a member held over from one term to another.

The SECRETARY: Let me ask the Chair then whether it be the ruling that the membership closes with the fourth Wednesday in January or the day preceding the fourth Wednesday in January?

The CHAIRMAN: The day preceding,—up to the fourth Wednesday in January which is the annual meeting of the Board. The ruling says that the member shall hold for three years and that is all. That is the law. We have it right here.

The SECRETARY: Mr. Chairman, shall the credentials be presented at this time?

The CHAIRMAN: The Chairman of the Committee will receive the credentials.

The CHAIRMAN: (Reading) "One-third of the members appointed shall retire from office on the fourth Wednesday in January in each year, according to the several appointments. The vacancies thus occurring shall be filled in the same manner as above provided, and the persons thus appointed shall hold their office for three years from the expiration of the former term. Other vacancies may be filled in the same manner, for the remainder of the vacant term."

The SECRETARY: Now, Mr. Chairman, you will observe there that the language of the Act of Assembly is that they "shall retire from office on the fourth Wednesday." The question in which I am the most particularly interested is the payment of expenses. If the retirement is actually on the fourth Wednesday and the successor, to the member who retires, takes his place on the fourth Wednesday, it does seem as though there are two persons whose expenses ought to be paid for attending the meeting. This is a matter upon which I want to be right.

The CHAIRMAN: The language is, "shall retire from office on the fourth Wednesday in January."

The SECRETARY: Then, Mr. Chairman, it will be a question to be determined by the Auditor General's Department, as to whether the expenses of any one who was elected, whose term expires with the year 1910 and attends this meeting, shall be paid.

The CHAIRMAN: I presume that is correct.

The SECRETARY: That is the part in which I am interested.

The CHAIRMAN: I am not clear as to whether the Board has any authority to determine this.

The SECRETARY: I do not think so, and yet the question is entirely new and I have not had time to think it over.

MR. SEXTON: Suppose a member has been appointed on a committee and is here to report, what then, even though his term expires today?

The SECRETARY: If he has been so appointed and is here to report, I have in the past taken the responsibility of approving his voucher and taking it to the Auditor General's Department with the statement that he was here for duty and that his expenses ought to be allowed.

MR. HUTCHISON: This is the fourth Wednesday, is it not?

The SECRETARY: It is.

MR. HUTCHISON: This is the day. The Governor does not go out of office until the day that he goes out. He is still Governor that day up to the time of the induction of the new Governor into office. Why is not Mr. McClellan a member of this Board. It says today he shall retire. Does not that recognize him as a member of the Board?

The SECRETARY: The Chair has ruled otherwise.

The CHAIRMAN: I think it is a matter for the Auditor General to decide.

MR. HUTCHISON: With all the officers in the Departments they remain until the day they go out.

The SECRETARY: Mr. Chairman, the gentleman is out of order unless he wants to appeal.

MR. HUTCHISON: This is for information.

The CHAIRMAN: If one person can continue over, then the whole Board can continue over and come to the meeting here and demand their expenses. If one is eligible, they are all eligible. It has been contrary to our previous custom at least.

The SECRETARY: In answer to the question raised by Mr. Sexton, I want to be understood that a precedent has already been established. Members who were on Standing Committees and came here to make their report were regarded by me as being entitled to their expenses, and I so presented the matter to the Auditor General's Department and it was allowed. This case, however, is different.

The CHAIRMAN: I think that is correct. The Secretary of the Board has authority to invite those to the Board, to address the Board, and fill up a program in that way, and the expenses have been paid.

The Committee on Credentials had better retire and attend to this matter of credentials. All those having credentials will pass them over to Mr. Rodgers, the Chairman. Mr. Rodgers, Mr. Seavy, Mr. Warburton, Mr. Taylor and Mr. Fenstermaker are the Committee.

MR. RODGERS: The Committee on Credentials will meet immediately in Secretary Critchfield's office. If there are any other papers to present, please give them to us.

The CHAIRMAN: Any members who came in recently, and delegates as well from any organizations, that have credentials, pass them over to the Committee on Credentials who are now about to retire.

The CHAIRMAN: We pass on, I presume, to the next thing on the program: Reports of Standing Committees and Specialists.

The SECRETARY: Reading of the Minutes should be the first thing taken up.

The CHAIRMAN: I overlooked that in the start. The minutes of the last session, held at York, May 25, 1909, will now be read by the Secretary.

The SECRETARY: My assistant will read the minutes if there are no objections.

The assistant to the Secretary then read the Minutes of the last meeting of the Board, which took place at York, Pa., May 25, 1909.

The CHAIRMAN: You have heard the reading of the minutes: any action, any remarks to make?

MR. BARNES: I move they be adopted as read.

The CHAIRMAN: They will be considered approved without a motion.

The CHAIRMAN: We are now ready to take up the Reports of Standing Committees and Specialists. The first on the program is the Report of the Committee on Cereals and Cereal Crops, A. P. Young, Chairman, Millville, Columbia county, Pa.

This Report was then read by Mr. Young, as follows:

REPORT OF THE COMMITTEE ON CEREALS AND CEREAL CROPS.

By A. P. YOUNG, *Chairman.*

Among cereal crops adapted to our soil and climate, we find corn, wheat and oats holding rank in value in the order named; corn easily standing first because of its extensive use as food for man and beast. Since the advent of the silo, it is possible to preserve the entire plant above the ground in its succulent and palatable form for stock food until it grows again—easily until Spring has awakened the grasses, and, with proper care, may be made to round out the year, or last until the crop is again ready to harvest.

Corn.

Great interest has lately been aroused in the corn crop by corn breeders' associations, corn shows, and seedsmen having seed corn of alleged superior merit for sale. All of these interests are possibly working for the betterment of the crop, and it sadly needs bettering, less than thirty bushels being the average yield, whereas, several times that is possible. Interest in the production of good corn has been growing for years. Selection and care of seed, varieties best adapted to the soil and climate of the particular section, preservation of seed in its best form and testing its germinating power before planting time, have received much attention. Preparation of the soil, fertilizing, time of planting, manner of planting, after care and cultivation, have all come in for consideration and study. It is easy to figure out a yield of corn on paper with rows four feet apart, hills three feet apart in the rows, three stalks in a hill, an ear of corn on each stalk ten inches long with sixteen rows of grains. But go to the field and look around. Perhaps, the first thing to catch the eye will be the frequently missing hills, then in some fields want of uniformity in number of stalks in the hill, one to five perhaps being often found; barren stalks with no sign of an ear, others with only a nubbin and frequently a mass of smut where should be a good ear. All these drawbacks to maximum yield are in a large measure preventable. The first two may be remedied by selection and care of seed and careful planting, being sure to get in seed enough, then wherever too many stalks appear, remove the weaker. Seed should be gathered early after maturity, thoroughly dried and then put where it will not be exposed to the atmospheric changes of winter. Seed corn, if exposed in an ordinary crib or outhouse, will absorb enough moisture during thaws in winter to seriously injure, if not entirely destroy its germinating power, if followed by a sharp freeze. If it grows at all, a weak plant is the result and no ear or even a nubbin is the product. The smut problem is somewhat more difficult to combat, but its prevalence can be very much reduced by going over the field care-

fully, taking out infected stalks, and destroying the germs by burning. This followed up year after year will reduce the loss from this source to a small margin.

Much of the "fuss and feathers" attendant upon testing seed corn may be avoided by proper selection and care of seed. For size and shape of ear and grain the selection can be made as readily when picking out the seed at gathering time as at planting time the next spring. A plot or side of the field may well be set aside from which to select seed. If it be impossible to give the entire field all the attention it should have, this part, at least, should be attended to carefully. Emasculate every barren stalk before it sheds any pollen, remove all smutty growths, no matter on what part of the stalk it occurs, let no weak stalk remain, this followed up year after year will reduce the loss from barrenness, want of vitality and smut, besides adding to the satisfaction of handling the crop.

There is another point in corn growing that is worthy of attention. Don't depend upon getting a first-class crop of corn from seed brought from a distance. Corn to do its best must be acclimated, must become a resident of the place, must have a little time to become acquainted with the soil as well as used to the atmospheric changes of the particular locality before it will do its best. Breeding seed corn is receiving great attention in some localities and it certainly promises well for America's most important cereal. Good seed well cared for from gathering to seeding time will start the crop toward a satisfactory harvest.

The Bureau of Statistics of the United States Department of Agriculture finds in its preliminary estimate of the average yield per acre 26.2 bushels. Compare this with one hundred bushels and more, which is possible, and we realize that a majority of corn growers must be raising very poor corn.

Columbus, on landing upon the soil of the Western Hemisphere—if we credit history—found corn growing with all the chief characteristics that mark it today, the leading if not the only cereal known to the dusky aborigines. Selection, improved cultivation and care has doubtless increased varieties as well as yield to some extent. The Department further gives us a comparison of yields, showing a little advance; 26.2 bushels in 1908, 25.9 bushels in 1907, 25.6 bushels for last ten years. Verily, improvement is slow, but we of Pennsylvania can congratulate ourselves upon producing more corn per acre than the great corn states of the Middle West—that we hear so much about as being the greatest corn field in the world, with what they some years ago boastingly claimed as their inexhaustible soils where they burned up and threw manures into the creek, in order to be rid of them. They, too, have come to realize the truth of Poor Richard's maxim—"Always taking out of the meal tub and never putting in will reach the bottom." Well illustrated in the course of the Western corn crop, for while they have not reached the bottom entirely—thanks to the ordering of Divine Providence—which makes it impossible to entirely exhaust the soil, nevertheless, the average yield is below the point of profitable production.

Nothwithstanding corn has been introduced wherever civilization has extended, nowhere has it found a more congenial soil than in the land of its nativity. About seventy-five per cent. of the world's production is credited to this country. The ingenuity of our people have

found many ways to utilize the crop. In the Paris Exposition of 1900, there was exhibited a museum case containing more than one hundred separate commercial products manufactured from corn, and development in this direction still continues. Our breakfast food manufacturers in their eagerness to get something new on the market do not stop at breakfast, but produce dinner and supper foods as well. It is fitting that corn should occupy the center of the stage in this country. It is *Native American.*

Wheat.

Unlike corn, wheat it not a native American grain. But it has been found to be wonderfully well adapted to our soil and climate, and the only reason why the yield falls below that of some of the older European countries, is the want of care in preparation, fertilization and cultivation. Like corn, the form and filling out of the ear has much to do with the yield. Ears of wheat pointed at both ends are not usually large producers of uniformly plump kernels, like the pointed ear of corn, the grains are quite apt to be small at the tip. One average yield is entirely too small, due primarily to want of care in selecting and caring for seed and carelessness or ignorance in preparing and fertilizing the seed bed. Wheat rapidly exhausts the soil of elements necessary for its best development. It is much more impatient than corn of improper treatment. Corn may continue to yield fair crops for several years from the same piece of ground, but wheat soon tires and must have more care in rotation, preparation of soil and more careful and intelligent management. Wheat is important from a commercial point of view. It readily lends itself to transportation, either as grain flour or finished products. The wheat and flour of this country have been a potent factor for years in relieving distress and saving lives in other lands.

Oats.

Of oats, the other cereal chosen to have attention briefly in this report, we can say that it seems to be less adapted to our soil and climate than either wheat or corn. Yet fitting into a rotation as it does, well adapted to our conditions and again its great value as a feed grain, it being a better balanced ration for the horse than any other grain we produce, makes it important. Being better adapted to the colder North countries seems to require that we renew its vitality frequently by getting seed from the more congenial climes.

With a paragraph emphasizing the need of bringing about better conditions of producing and caring for the best possible seed and its dissemination, we will close this report.

We hear much of technical schools and the importance of special training is certainly not overestimated. At this time when the school question is so prominently before us, may we not enter a plea for more specific Agricultural Education in rural schools.

Since the advent of the Township High School we hear something of teaching agriculture. Town schools are searching about for vacant lots to utilize in imparting instruction practically in Nature Study, the growth of plants. They want to teach agriculture.

Now, when this school question is finally threshed out, may we not have provision for a farm school, wherever in the rural districts sufficient pupils can be got together to warrant a veritable farm school with farm and stock and all the paraphernalia necessary to make intelligible, not only the theory but the practice as well, where the boys and girls can get hold with their hands of all the jobs that must be done about the farm and household. Not as depicted by Charles Dickens in his satire upon doings in his day. He depicted it in this way, using a somewhat vulgar setting:

"Oh mother may I go out to swim?
Why yes, my dearest daughter:
But hang your clothes on the hickory limb,
And don't go near the water."

The propagation and dissemination of improved varieties, with proper care, would add much to the production of every township. Let the school farm take up this work under competent instruction—let it be an experiment station—a dissemination of information of all kinds valuable to the neighborhood—theory and practice, not theory alone. Let us of the rural districts push for better things in the country. We have been going to town too long for education. They teach in the town the arts of the town, let us teach in the country the arts that are appropriate to the country.

During the reading of this paper, Mr. Sexton, the third Vice-President, took the Chair.

The CHAIRMAN: You have heard the reading of the report. What action do you take?

A motion was duly made, seconded and carried that it be received and placed on file for publication with the proceedings of the Board.

The SECRETARY: Mr. Chairman, if you will allow me—the Governor is likely to have a very busy week, and I was in conversation with him yesterday and he said that he would like to come in to attend the meetings of the Board as much as possible, and in order that he may have the opportunity of selecting the time when he can come, I suggest that we, perhaps, had better appoint a committee to wait on him now, and I therefore move that a committee be appointed to wait upon the Governor and tell him we are in session and ask him to meet with us when he can.

The motion was seconded, put and carried.

The CHAIRMAN: My attention has been called to the fact that we have a resolution passed by the Board last year or year before, that these reports of committees not only be read, but they must not exceed fifteen minutes, so that we will have to hold you pretty strict to that in order to get over the program this morning.

I will appoint on the committee to wait on the Governor and invite him to our sessions, Dr. Schaeffer, Mr. Kahler and Mr. Hutchison.

DR. SCHAEFFER: I suggest that you appoint someone else. I am just on my way to another part of the building to look after some other matters.

The CHAIRMAN: It might be well for you to take some of our members over and introduce them.

MR. HUTCHISON: You had better appoint someone in my place as I will have to present my report very shortly. Just appoint one of the other brothers; Brother Shoemaker, here would be a good one.

The CHAIRMAN: It ought not to take long to call upon the Governor. However, we will appoint Mr. Shoemaker in your stead.

The CHAIRMAN: The next thing on the program is the Report of the Committee on Dairy and Dairy Products, Dr. M. E. Conard, Chairman, Westgrove, Pa. Is Dr. Conard present?

The SECRETARY: I have not seen him yet.

The CHAIRMAN: The next on the program is the Report of the Committee on Feeding Stuffs, George G. Hutchison, Warrior's Mark, Pa.

Mr. Hutchison, thereupon, read his report as follows:

REPORT OF THE COMMITTEE ON FEEDING STUFFS.

By G. G. HUTCHISON, *Warriors Mark, Pa.*

To the Members of the State Board of Agriculture:—As your representative and specialist under the Feeding Stuffs Control of the Department of Agriculture, I beg leave to make the following report of our work for the year that has just closed:

This has been a very busy year in our Bureau. As stated to you a year ago at your meeting, the Feeding Stuffs Law was then before the Court of Lehigh county and was being tested on its constitutionality on the question of the preference given to the millers of Pennsylvania in regard to the sale of bran and middlings at the place of manufacture. Judge Bechtel decided that that portion of the law was unconstitutional.

Anticipating this decision, we prepared a new Feeding Stuffs Law and eliminated that clause that referred to the sale of bran and middlings where manufactured. This law is now upon the statute books and it is the one which we are working under at this time. You have all been furnished with copies of it and are no doubt familiar with its requirements.

The New Law.

The new law, as it passed the House, was a very drastic measure, in some particulars, as it prohibited the mixing of oat hulls, corn cobs, weed seeds, rice hulls, peanut hulls and similar substances with any feed that was sold or offered for sale in Pennsylvania. The bill passed the House as originally prepared, but when it came to the Senate, the manufacturers of feeds that used oat hulls and corn cobs as a mixture with their feeds, requesting a hearing, and after a number of hearings, in which both sides were represented, the bill

was finally passed, allowing the mixing of oat hulls with feed, but not in an amount to exceed nine per centum of fiber. The bill also allows the mixing of corn cob with corn products, but not in amount to exceed nine per centum of fiber and they cannot be mixed with any other feed and sold. It also allows the grinding of whole corn without being shelled or with other grains.

The law also places bran and middlings under the same heading as whole grains. Whole grains can be ground either separately or mixed together and do not need to have the percentage of protein, fat or fiber. Bran and middlings can also be sold when pure without the placing of the analysis on same. There has been a great deal of controversy in regard to the placing of analysis on brans. They vary from two to three per cent. in protein in some samples. This caused a great deal of hardship and controversy among the dealers.

The feature in the new law that will be the greatest benefit to the farmers and feeders of domestic animals in Pennsylvania, is the one that prohibits the mixing of weed seeds, rice hulls and peanut hulls with feeds. Weed seeds was one of the mixtures that was used very extensively by the manufacturers of molasses feeds according to our reports and those of Vermont and Maine Experiment Stations. These seeds were not digestible except when fed to chickens or sheep; hence, all that were fed to other domestic animals were not assimilated and were worthless. As soon as the law was put into effect, which was the first of August, 1909, the majority of the manufacturers of molasses feeds stopped mixing weed seeds with other feeds that were shipped into Pennsylvania. They were known to the trade as wheat screenings, and this was misleading. Wheat screenings, as recognized by the Department, are small grains of wheat or broken grains of wheat, not weed seeds. So much for the adulterants.

By-Products.

Now comes a vital question in regard to feeds, and that is the by-products that are found upon the markets of our State. These by-products are very valuable and there is a great demand for them among our feeders. I wish to state that I am not opposed to the feeds that are manufactured from the by-products if they are sold for what they are and sold for the amount of protein and fat which they contain, and a true statement giving the amount of fibre and also their composition. This gives the purchaser plain notice of what he is buying. The fibre-content of feed has a great deal to do with the availability of the protein-contents, and feeders should educate themselves to understand that a feed which is high in fibre is not as digestible a feed as one which is low in fibre; or in other words a feed which is high in fibre has not as much of its protein available as one that is low in fibre.

For example, take alfalfa meal and compare it with wheat bran. We find the analysis of alfalfa meal to run about 15 to 16 per cent. protein, from 1½ to 3 per cent. fat and from 28 to 33 per cent. fiber. We find wheat bran to run from 15 to 16 per cent. protein, 5 per cent. fat and 10 per cent. fiber. Taking the fibre-contents of these materials, you will find that when one-third of the protein in the alfalfa meal is fiber, also one-third of the fat is in the fiber-content, but taking the

bran, we find that 10 per cent. of this is fiber or one-tenth of the protein would be in the fiber and one-tenth of the fat. This gives you some idea of the value of these two feeds in comparison one with another.

My object in calling your attention to this is to get you thinking along this line, and also to get the scientists interested in working out the problem of the digestibility of the feed. I have called the attention of some of the Directors of our Experiment Stations to this important subject, not only in our own State, but in other states. Their claim is that they do not have sufficient funds to take up this work. To my mind there is nothing so important to the farmers and feeders as this question. I hope to see an ample appropriation made for this purpose either by the states or by the National Government. We have a well equipped plant in our own State at State College, and it is in charge of one of the most competent scientists, Doctor Armsby, that there is in the United States, and I hope that it is not afar off when this matter will be taken up and experiments worked out that will be reliable and that there will be no controversy on this subject.

The feed manufacturers throughout this State and other states have been keeping in close touch with the Department in regard to the law and also in regard to the different brands of feeds that they are placing upon our markets. Each year they place on file in the Department a certified copy of the analysis of their feeds for protein, fat and fiber and also the composition of the different feeds. This aids us in keeping in close touch with what they are doing.

We have in the last year secured samples in each of the 67 counties in the State. The following is a tabulated statement, giving the number of samples secured in each county, the towns visited, the number of samples taken in each town, and also the towns visited in which samples were not taken, because similar samples had been drawn in other sections, and it was impossible to duplicate the samples, as it would flood the laboratory with a large amount of work that would not be of any consequence. The number of samples that this table represents is 1,307, all of which have been analyzed by our Chief Chemist, Mr. James W. Kellog, and his assistants:

Tabulated Statement.

Name of County.	Town or City Visited.	Number samples collected in each town or city.	Number samples collected in each county.
Adams,	Gettysburg,	3	
	Littlestown,	None taken.	3
Allegheny,	Pittsburg,	5	
	McKeesport,	6	
	Braddock,	7	
	Carnegie,	4	
	Duquesne,	None taken.	
	Wilmerding,	None taken.	
	Homestead,	None taken.	22
Armstrong,	Apollo,	4	
	Leechburg,	3	
	Freeport,	4	
	Kittanning,	7	
	Ford City,	2	
	Parker's Landing,	None taken.	20
Beaver,	Beaver Falls,	10	
	New Brighton,	3	
	Beaver,	4	
	West Bridgewater,	4	
	Rochester,	None taken.	
	Monaca,	None taken.	
	Freedom,	None taken.	21
Bedford,	Six Mile Run,	4	
	Hopewell,	1	
	Everett,	5	
	Bedford,	6	
	Coaldale,	None taken.	
	Hyndman,	None taken.	
	Saxton,	None taken.	16
Berks,	Reading,	23	
	Kutztown,	3	
	Fleetwood,	4	
	Birdsboro,	None taken.	
	Douglassville,	3	
	Boyertown,	None taken.	33
Blair,	Altoona,	41	
	Juniata,	5	
	Hollidaysburg,	2	
	Martinsburg,	6	
	Roaring Springs,	1	
	Tyrone,	2	
	Bellwood,	None taken.	
	Duncansville,	None taken.	
	Gaysport,	None taken.	
	Williamsburg,	None taken.	57
Bradford,	Troy,	3	
	Canton,	8	
	Towanda,	8	
	Athens,	4	
	Sayre,	None taken.	23
Bucks,	Doylestown,	9	
	Chalfont,	4	
	Colmar,	4	
	Quakertown,	4	21
Butler,	Butler,	14	
	Mars,	1	
	Valencia,	1	
	Evans City,	2	
	Harmony,	2	
	Zelienople,	None taken.	20
Cambria,	Cresson,	2	
	Gallitzin,	1	
	Barnesboro,	2	
	Spangler,	1	
	Carrolltown,	3	
	Ebensburg,	2	
	South Fork,	2	
	Johnstown,	14	
	Hastings,	None taken.	
	Conemaugh,	None taken.	27

Name of County.	Town or City Visited.	Number samples collected in each town or city.	Number samples collected in each county.
Cameron,	Emporium,	3	3
	Driftwood,	None taken.	
Carbon,	East Mauch Chunk,	5	
	Mauch Chunk,	None taken.	
	Lansford,	2	
	Lehighton,	3	
	Weissport,	3	
	Slatington,	None taken.	13
Centre,	Philipsburg,	11	
	Bellefonte,	4	
	State College,	4	
	Centre Hall,	None taken.	
	Howard,	None taken.	
	Milesburg,	None taken.	19
Chester,	Coatesville,	7	
	Parkesburg,	4	
	Pomeroy,	None taken.	
	Modena,	2	
	Mortonville,	2	
	Downingtown,	7	
	West Chester,	12	
	Phoenixville,	8	
	Frazer,	None taken.	
	Kennett Square,	8	
	West Grove,	4	
	Avondale,	None taken.	
	Paoli,	8	62
Clarion,	East Brady,	3	
	New Bethlehem,	2	
	Clarion,	5	
	Knox,	None taken.	10
Clearfield,	Du Bois,	5	
	Osceola Mills,	3	
	Wallaceton,	1	
	Clearfield,	4	
	Coalport,	None taken.	
	Curwensville,	None taken.	
	Houtzdale,	None taken.	
	Irvona,	None taken.	
	Mahaffey,	None taken.	
	Ramey,	None taken.	
	McKees Gap,	None taken.	
	La Jose,	None taken.	
	Morrisdale,	None taken.	
	Munson,	None taken.	
	Woodland,	None taken.	13
Clinton,	Lock Haven,	2	
	Mill Hall,	None taken.	
	Renovo,	None taken.	
	Flemington,	None taken.	2
Columbia,	Bloomsburg,	3	
	Catawissa,	8	
	Berwick,	3	14
Crawford,	Titusville,	9	
	Cochranton,	5	
	Saegertown,	7	
	Meadville,	1	22
Cumberland,	Shippensburg,	3	
	Carlisle,	5	
	Newville,	2	
	Mechanicsburg,	6	16
Dauphin,	Harrisburg,	22	
	Middletown,	6	
	Steelton,	None taken.	
	Hummelstown,	2	30
Delaware,	Media,	5	
	Lansdowne,	1	
	Morton,	1	
	Swarthmore,	None taken.	
	Moylan,	None taken.	
	Chester,	17	17

Name of County.	Town or City Visited.	Number samples collected in each town or city.	Number samples collected in each county.
Elk,	Ridgeway.	8	
	St. Marys,	4	
	Johnsonburg,	4	16
Erie,	Corry,	4	
	Union City,	1	
	Erie,	19	
	Waterford,	None taken.	24
Fayette,	Uniontown,	6	
	Bellevernon,	None taken.	
	Connellsville,	None taken.	
	Dunbar,	Nane taken.	
Forest,	Tionesta,	6	6
Franklin,	Waynesboro,	5	
	Greencastle,	None taken.	
	Chambersburg,	3	8
Fulton,	Waterfall,	4	
	Dublin Mills,	None taken.	
	Graeey,	None taken.	4
Greene,	Waynesburg,	6	6
Huntingdon,	Petersburg,	4	
	Alexandria,	4	
	Huntingdon,	3	
	Mt. Union,	5	
	Mapleton,	4	
	Three Springs,	2	
	Orbisonia,	4	26
Indiana,	Saltsburg,	6	
	Blairsville,	5	
	Blackliek,	3	
	Homer,	3	
	Indiana,	5	
	Clymer,	3	
	Ernest,	None taken.	25
Jefferson,	Punxsutawney,	7	
	Lindsey,	2	
	Big Run,	1	
	Reynoldsville,	3	
	Brockwayville,	4	
	Brookville,	7	
	Summersville,	None taken.	24
Juniata,	Mifflin,	3	
	Port Royal,	None taken.	
	Thompsontown,	None taken.	3
Laekawanna,	Scranton,	22	
	Carbondale,	None taken.	
	Dunmore,	None taken.	22
Lancaster,	Lancaster,	43	
	Lititz,	14	
	Columbia,	8	
	Manheim,	13	
	Rheems,	4	
	Elizabethtown,	7	
	Ephrata,	None taken.	
	New Holland,	None taken.	
	Mt. Joy,	None taken.	
	Florin,	None taken.	
	Marietta,	None taken.	89
Lawrence,	New Castle,	13	
	Ellwood,	None taken.	
	Mahoningtown,	None taken.	13
Lebanon,	Lebanon,	8	
	Myerstown,	7	
	Annville,	3	18
Lehigh,	Allentown,	21	21
Lycoming,	Jersey Shore,	None taken.	
	Williamsport,	10	
	Newberry,	2	
	Muney,	5	
	Montgomery,	None taken.	17
Luzerne,	Wilkes-Barre,	17	
	Nanticoke,	3	
	Luzerne,	2	

Name of County.	Town or City Visited.	Number samples collected in each town or city.	Number samples collected in each county.
	Pittston,	None taken.	
	Edwardsville,	None taken.	
	Plymouth,	None taken.	
	Nescopeck,	None taken.	34
McKean,	Port Allegany,	5	
	Eldred,	None taken.	
	Kane,	3	
	Bradford,	5	
	Smethport,	5	
	Mt. Jewett,	None taken.	18
Mercer,	Grove City,	5	
	Mercer,	2	
	Greenville,	2	
	Sharon,	4	
	South Sharon,	6	
	Sharpsville,	None taken.	
	West Middlesex,	None taken.	
	Wheatland,	None taken.	19
Mifflin,	Lewistown,	12	
	McVeytown,	3	
	Newton Hamilton,	None taken.	15
Monroe,	East Stroudsburg,	6	
	Stroudsburg,	8	14
Montgomery,	Pottstown,	19	
	Norristown,	10	
	Mont Clare,	None taken.	
	William Penn,	2	
	Conshohoeken,	2	
	West Point,	8	
	Lansdale,	1	42
Montour,	Danville,	6	6
Northampton,	South Bethlehem,	6	
	Easton,	11	
	Bethlehem,	6	23
Northumberland,	Sunbury,	5	
	Watsontown,	3	
	Mt. Carmel,	3	
	Shamokin,	9	
	Northumberland,	None taken.	
	Snydertown,	None taken.	
	Milton,	None taken.	20
Perry,	Newport,	4	
	Millerstown,	4	
	Duncannon,	4	
	New Bloomfield,	2	
	Marysville,	5	19
Philadelphia,	Philadelphia,	14	14
Pike,	Laekawaxen,	2	2
Potter,	Coudersport,	2	
	Genesee,	5	
	Galeton,	3	
	Austin,	None taken.	
	Ulysses,	None taken.	16
Schuylkill,	Pottsville,	6	
	St. Clair,	5	
	Port Carbon,	None taken.	
	Tamaqua,	3	
	Minersville,	4	
	Schuylkill Haven,	None taken.	
	Palo Alto,	None taken.	18
Snyder,	Swineford,	1	
	Globe Mills,	1	
	Selinsgrove,	4	6
Somerset,	Windber,	4	
	Somerset,	5	
	Hooversville,	None taken.	
	Stoyestown,	None taken.	
	Hollsopple,	None taken.	9
Sullivan,	Dushore,	4	4
Susquehanna,	Montrose,	8	
	Great Bend,	3	

Name of County.	Town or City Visited.	Number samples collected in each town or city.	Number samples collected in each county.
	Forest City,	6	
	Hallstead,	None taken.	
	Susquehanna,	None taken.	17
Tioga,	Westfield,	2	
	Wellsboro,	12	
	Mansfield,	8	
	Blossburg,	4	
	Lawreneeville,	None taken.	26
Union,	Lewisburg,	5	
	Mifflinburg,	5	
	Vieksburg,	None taken.	10
Venango,	Emlenton,	1	
	Oil City,	7	
	Franklin,	3	
	Utica,	None taken.	11
Warren,	Warren,	2	
	Youngsville,	2	
	Clarendon,	None taken.	
	Tidioute,	None taken.	
	Sheffield,	None taken.	4
Washington,	Washington,	17	
	Canonsburg,	8	
	Huston,	None taken.	25
Wayne,	Honesdale,	11	
	Hawley,	None taken.	11
Westmoreland,	Derry,	4	
	Latrobe,	4	
	Greensburg,	8	
	Manor,	3	
	Irwin,	4	
	Mt. Pleasant,	5	
	Scottdale,	7	
	Jeannette,	None taken.	
	Monessen,	None taken.	
	New Kensington,	3	
	Penn,	None taken.	
	Vandergrift,	5	
	Parnassus,	3	46
Wyoming,	Tunkhannock,	8	
	Meshoppen,	8	
	North Mehoopany,	3	
	Mehoopany,	None taken.	19
York,	York,	35	
	Red Lion,	4	
	Hanover,	8	
	Wrightsville,	None taken.	47

A bulletin will soon be published giving the analysis of each sample for protein, fat and fiber and the composition of the feeds and all other information that the law directs to be given.

Samples Analyzed for Individuals.

There have also been received by the Chief Chemist 322 samples sent in by citizens of our Commonwealth to have analyzed for their own information. As you understand, this is done as provided for by law; but a charge of one dollar is exacted from the parties sending in a sample. This fee is deposited in the State Treasury for the benefit of the State at large and none of it is available for the use of the laboratory. Some may question why this fee of one dollar is charged to our citizens. The reason is that it would put a check on the number of samples that would be sent in and not take up the

time of the chemist that should be devoted to other work, but this does not begin to cover the cost. You can see that this gives you the number of samples of feeding stuffs which have been analyzed, making 1,629.

In analyzing feeds for our citizens it gives them an opportunity to keep a check on the dealers from whom they purchase feed. I would call your attention to one or two cases which come to my mind at this time. A number of farmers, members of a certain Grange in Lancaster county, purchased a carload of cottonseed meal. They discovered that there was some cottonseed hulls or something that resembled them mixed with their meal. They drew a sample, sent it to the Department with one dollar enclosed, had it analyzed and found that they had bought cottonseed meal that did not come up to the amount of the guarantee, and the Chemist gave them the amount that they had paid the jobber, but did not receive value for. They called his attention to the matter and the jobber refunded them $25.00. Another case in the same guarantee where the matter was taken up in a similar manner, a sample was analyzed and the jobber refunded $22.50. I call your attention to these cases to show how purchasers of feed could protect themselves, and I believe in a short time feed then would be sold on its analysis of protein, fat and fiber.

In the months of April and May of last year, there was shipped into this State a large amount of wheat bran and wheat middlings. These shipments were made from Buffalo, N. Y. It was adulterated with ground corn cobs and the amount was 40 to 50 per cent. We secured samples in McKean, Potter, Tioga, Bradford, Lycoming, Elk and Cameron counties. We brought suit on all of these cases and the mixer or compounder of these feeds in Buffalo paid fines to the dealers amounting to over one thousand dollars. This was a dear lesson to the manufacturer in Buffalo, but it was also dear feed to the farmers where it was sold. These corn cobs were ground as fine as middlings and could not be detected except by analysis. The jobber paid the fine, but who will refund the money to the men who paid and fed the feed?

A word of caution in regard to men in high positions in agriculture making statements in regard to feed.

I will call your attention to one case. Hon. James Wilson, Secretary of Agriculture, gave out a letter, under date of November 14, 1904, saying "he would rather have a pound of dried beet pulp to feed to a dairy cow than a pound of corn, and I would rather have it in many cases where the object is the make of fat, solely."

The Secretary is mistaken or the Chemist must be. We will take the analysis of two samples of dried beet pulp in 1907. Protein, 8.85 per cent., Fat, 0.79 per cent., Fiber, 19.08 per cent., four samples in 1908, Protein, 9.56 per cent., Fat, 0.92 per cent., Fiber, 19.40 per cent.

Corn meal or corn chop analyzes:

Protein 10.50 per cent., Fat 5.02 per cent., Fiber 2.20 per cent.

Why do we find corn higher in Protein by 2 per cent., higher in Fat by over 4 per cent. and lower in Fiber by 17 per cent.?

This statement has mislead farmers all over the United States in buying beet pulp. I do not condemn beet pulp, but I do say it is not as valuable as pure corn for feed, and a farmer is making a mistake that pays as much for it as beet pulp.

The following table will explain at a glance how we have endeavored to show the chief cereals and seeds together with the products gotten from the miller and those gotten from different manufacturing processes in which grains are used.

We have also tabulated the different by-products which are used as adulterants, some adulterated feeds and all miscellaneous products used in or obtained from manufacturing processes.

Specimens of all these products will be found in the exhibit together with a collection of the common drugs used in condimental foods and we have also added a collection of wheat and corn from different countries, the analysis of which we hope to have at some later time.

You will also find samples of different mixed feeds and molasses feeds which have been on or are on the market. These specimens show the composition, together with their analysis.

Grains or Seeds.	Mill Products.	By-Products from Mfg. Useful for Feeding Purposes.	By-Products Used as Adulterants.	Adulterated Feeds.	Miscellaneous Products.
Alfalfa,	Alfalfa meal.				
Barley,	Bran,	Malt sprouts, brewers' grains.		Brewers' grains with rice hulls.	
Buckwheat,	Shorts, middlings, flour,	Hulls and middlings,	Hulls.		
Corn,	Cracked corn, corn meal, red corn bran.	Distillers' grains, gluten feed, hominy feeds, white corn bran, corn oil cake, refuse from Kelloggs Toasted Corn Flakes.	Cleanings from corn, mostly cob. Screenings from corn, mostly cob. Ground corn cob.		Corn oil, corn germ, coloring matter used for coloring gluten feed.
Wheat,	Graham flour, middlings, shorts, bran.			Wheat middlings with corn cobs.	
Oats,	Flaked oats, hulled oats, bran.		Oat hulls.		
Cottonseed,	Ground cottonseed,	Cottonseed meal, oil cake,	Cottonseed hulls. Hull bran.		Feeds containing varying quantities of hulls aud meal.
Flaxseed,	Ground flaxseed,	New process oil meal, old process oil meal.	Flax screenings and flax plant refuse.	Linseed oil meal and flax screenings.	Linseed oil.
Rice,	Bran, polish,		Hulls,	Brewers' grains with rice hulls, molasses feed with rice hulls.	
Peanut,	Meal,		Bran and ground hulls.		
Rye,	Flour, middlings.				

Miscellaneous Materials Used for Feeding Purposes.	Used as Adulterants.
Meat meal.	Cocoa hulls.
Dried sugar beet.	
Distillery slop.	
Hay.	
Straw.	
Spelts.	
Locust bean meal.	
Granulated milk.	
Salt.	
Seeds.	
Grits.	
Bone.	

Collection of Feeds.

I would like to call your attention to our collection of feeds that is here displayed for your benefit. They have been gathered together in our laboratory as an educational exhibit, where you can see the different products of feed which are derived from the different cereals. We had it at State College during Grange Week. We were more than pleased at the interest that was taken in it by the farmers. Part of the time it took three men busy answering questions and explaining the different materials. We have here over 150 samples. We would be pleased to explain to you the exhibit.

Improvement in Quality of Feeds.

There has been a marked improvement in the quality of feed coming into our State. What shows this better than anything is the number of prosecutions which have been brought by direction of the Secretary of Agriculture in the following counties:

Allegheny,	2
Armstrong,	1
Blair,	3
Bradford,	2
Butler,	1
Clarion,	1
Cumberland	1
Delaware,	1
Erie,	3
Elk,	4
Huntingdon,	1
Lackawanna,	3
Lancaster,	1
Lawrence,	1
Luzerne,	1
McKean,	4
Lycoming,	1
Mercer,	1
Monroe,	3
Northumberland,	2
Philadelphia,	3
Potter,	6
Tioga,	8
Westmoreland,	1
York,	2
	59

In all the prosecutions that were brought the past year before aldermen and courts, we were successful in securing conviction and fines in all the cases but one and in that case, the cost was imposed upon the defendant.

Last year there were 128 prosecutions. This shows that there is a better condition existing than there was last year, and I would say that the largest number of these prosecutions were made against the Buffalo party who flooded our State with adulterated wheat bran and wheat middlings. The interpretation that the Department places upon the law is that it is not for the means of securing revenue, but it is for the protection of purchasers of concentrated and commercial feeds to give them the full value of their money at the fair market price.

Friends, this is one of the most important subjects that comes before a meeting of this kind. It represents large sums of money to you and to all, and our endeavor is to keep the markets as clean of adulterated feed as possible. I want to thank you all for the aid you gave us last winter in the passage of the new law and of the work you did to have the bill a law. What we need is more money to employ more men to visit dealers and manufacturers and to secure samples oftener. We ought to call on each dealer or manufacturer four times a year, and in this way keep in touch with the trade.

Bureau of Chemistry.

Our laboratory is situated on the fifth floor of the Capitol Building. The following is a list of the chemists, general agent and special agents, also clerk and steongrapher:

James W. Kellogg, B. Sc., Chief Chemist.
John S. Spicer, B. Sc. First Assistant Chemist.
George L. Walters, B. Sc., Second Assistant Chemist.
Malcolm H. Ulman, B. Sc., Third Assistant Chemist.
Franklin Menges, Ph. D., Special Assistant Chemist.
Elmer C. Gildroy, Ph. C., Special Assistant Chemist.
W. Earl Huber, Laboratory Assistant.
L. Pearl Gustin, Stenographer and Clerk.
Geo. G. Hutchison, General Agent.
John F. St. Clair, Special Agent.
W. John Stiteler, Special Agent. (Paris Green and Linseed Oil.)
Prof, Menges is employed on Paris Green work.
Mr. Gildroy is employed by the Dairy and Food Commissioner.

Our Chief Chemist and his corps of assistants would be glad to see any of you and show you their workshop. We have now in preparation a new bulletin giving the work done in 1909, and we will send each one of you a copy, but we would be pleased for each member of this Board to send in a list of names. These names will be placed on our mailing list and kept there for future bulletins.

As a recognition of the good work we have been doing during the past years, the Federal Government offered our former Chief Chemist, Mr. F. D. Fuller, a position with them in an effort to carry out the provisions of the National Pure Food and Drug Law, which also covers the commercial feeding stuffs sold throughout the United States. Mr. Fuller severed his connections with this Department on April 1, 1909, and was succeeded by the First Assistant, J. W. Kellogg, who is now the present incumbent.

I want to make special mention at this time of the efficient work that has been done by Special Agent, John F. St. Clair. Mr. St. Clair has devoted his best energies to the work of securing samples throughout the Commonwealth and has proved very efficient in the position he occupies.

I also want to return thanks for the courtesies received from the Secretary of Agriculture and the confidence that he has placed in me as his representative in this work.

I wish also to acknowledge the courtesy and kind words that have been spoken by the agricultural press as well as trade journals that represent the different feeding and milling interests in this State and other states. I also take this opportunity of expressing my thanks to the press of Pennsylvania for their able assistance and their endeavor to keep the importance of this question before the public. I also wish to return my thanks to the different agricultural organizations throughout Pennsylvania for their assistance in our work.

Vice President Herr resumed the Chair during the reading of Mr. Hutchison's report.

The CHAIRMAN. What disposition shall be made of the report of Mr. Hutchison?

DEPUTY SECRETARY MARTIN. Will a question be in order?

The CHAIRMAN. I prefer to have a motion before the Board relative to some action to be taken on the report first.

On motion duly made and carried, the report was received and filed for publication with the proceedings of the meeting.

DEPUTY SECRETARY MARTIN. Mr. Hutchison, referring to the provision in the act permitting the addition of 9 per cent. fiber, did you state in what particular kinds of feed sold in this State this fiber is used?

MR. HUTCHISON. You know all feeds have a small percentage of fiber. As I stated, corn meal, ground corn grain has about 2 per cent. Now, a number of these by-products have a small amount of fiber; but the poorer the feed, the more worthless the feed, the higher the fiber. You take any of these by-products, brewers' grain don't run high in fiber, nor distillers. The fiber contents is the woody part.

DEPUTY SECRETARY MARTIN. Of these feeds sold in Pennsylvania, what ones have this fiber added?

MR. HUTCHISON. Well now, you want me to name the kind of feeds that have this fiber? It is the molasses feeds. You will find some of them high in fiber. But now, under this new act, they are bringing them all below 9 per cent. You find the higher fiber in corn cobs and oat hulls. Corn cobs, 28 to 33 per cent. of fiber and in oat hulls the percentage of fiber is only a little lower.

The SECRETARY: What is the percentage of fiber in oats, whole oats?

MR. HUTCHISON: I will have to look at that.

DEPUTY SECRETARY MARTIN: Could they add fiber to whole oats?

MR. HUTCHISON: No, sir. They could grind the oats and mix the fiber in.

DEPUTY SECRETARY MARTIN: Suppose they could add about 9 per cent., what then?

MR. HUTCHISON: They would violate the law. The law holds them to 9 per cent. They take a low grade feed, lower in fiber, such as hominy and feeds of that kind.

A Member: They cannot adulterate bran?

MR. HUTCHISON: This law provides it must be pure.

A Member: I would like to ask why they are allowed to put in 9 per cent. if fiber itself is worthless?

MR. HUTCHISON: 11.8 per cent. protein and 9.5 fiber, that is the analysis of the whole oat grain.

The SECRETARY: If you will allow me a moment to answer Mr. Martins' question more particularly.

The claim was set up by feed manufacturers who came before the Senate Committee, that in the compounding of certain feeds, it was necessary to use a certain amount of fibrous matter or fiber in order to lighten the feed. They raised the claim that there are some feeds that are too heavy without them; they become in the stomach of the animal a mucilaginous mass and it is necessary to have something with them. Now, the bill as it stands was a compromise. The Department of Agriculture and others, members of the General Assembly, were disposed to stand for a bill that would not admit even of oat hulls in any compounded feed. But you see, sometimes it is necessary to take something and to give something in reaching a compromise so as to secure the very best thing you can get. Now, the feeds into which this fiber can be introduced are such feeds as are declared by feed manufacturers to be so heavy as to become a mucilaginous mass upon which the gastric juices of the stomach will take no hold. That claim was set up. I was not present at the meeting of the Committee, but kept in pretty close touch with what was going on. I understood the claim was set up that domestic animals very often became sick,—indigestion, flatulency, was caused by the introduction of this heavy mass into the stomach and it was necessary to use something to lighten up these feeds. Mr. Hutchison attended most of these meetings and he can tell you whether I am correct in this statement or not. And so the members of the General Assembly who were contending for the very best feed that was possible, who were contending for the feed in which there was no adulteration permitted, had this brought up to them and a compromise was reached fixing the low percentage of fiber that must be maintained.

DEPUTY SECRETARY MARTIN: I quite agree with the worthy Secretary in this explanation. My question was rather leading up to the point that is more vital to the farmer and the man who is purchasing feed, in order to learn what particular feeds are now upon

the market in which fiber is placed. That is the idea; not to find any exception with the formation of the law whatever. I take it to be patent to-day, under the law and think it would be altogether proper for this bureau to give to the man who purchase feed the information sought after by my question. What feeds are now placed upon the market that have fiber added to them? I take it that the farmer of to-day don't need to purchase much fiber, and he ought to know when he is purchasing feeds what particular feeds contain that material.

MR. HUTCHISON: This matter was fought out by as able men on the other side, on that line, as I believe there are to-day in the United States, coming from the far West. I mean now, the able men were on the other side. The House passed the bill as originally drawn, as stated, prohibiting oat hulls and corn cobs; but when it came to the Senate, of course, these men who represent these large industries came on and, as the Secretary has said, had hearings, a number of them, before the Committee. That thing was well threshed out and I think we are to be complimented in this State, other states referring to our law as the best law on the statute books in regard to the control of feeds. It is not perfect. We have got it down that we can control them; that the percentage of fiber is as low as it is in the oats you grind and they have got to put in good material to balance that up. This is a question of controversy, as the Secretary has stated. We have taken higher ground than any other state in the Union on the question, and we have got the support of the agricultural press, as well as the support of the trade journals, with the exceptions of a few, and I tell you, friends, we have never got further on. Any law that prohibits the selling of weed seeds, rice hulls and peanut shells is a great step in the right direction.

So they may put some fiber in. My contention has always been that the farmer raises lots of fiber on his farm and you need have no fear in purchasing the feed stuffs on the markets of Pennsylvania to-day as you had some years ago, if you keep in touch with the Department, when you have any thought or doubt about them, and if you will only read the composition on the sacks. But the feed man says the farmer comes into his place and takes the feed out and don't read the composition on the sacks.

MR. CREASY: I have not understood yet whether they can put the 9 per cent. of fiber in corn chop?

MR. HUTCHISON: They can adulterate the corn chop, yes, sir, with ground corn cobs.

The SECRETARY: They cannot call it corn chop?

MR. HUTCHISON: No, sir; they call it mixed feed.

The SECRETARY: In order to answer Brother Martin's question: The fiber is put into the mixed feeds. It is put into such feeds as are very starchy and which it is claimed become a mucilaginous mass in the stomach of the animal. For instance, if you will take chopped rye, which is known as a good feed, it would not be a good feed for domestic animals given alone, so the feed manufacturer will take some chopped rye and best quality of white middlings and put some-

thing in which is lighter and call it something else, call it prime dairy feed or something of that kind. It must have some other name. It cannot go into corn chop or rye chop and still be sold as such; it cannot go into middlings or bran and the article still be sold under those names. It is sold then as a mixed feed having some distinct name. Does not that answer your question?

MR. CREASY: That answers my question.

DEPUTY SECRETARY MARTIN: I was not aware that my simple question was going to arouse such a sentiment on the matter. I was aware that it was an important matter, an important question. The import of my question was simply this: The purchaser of these feeds should in some manner or other have made plain to him just what the composition of these feeds are.

The SECRETARY: The Act of Assembly provides that.

DEPUTY SECRETARY MARTIN: He should have that in the analysis of these feeds. Has he learned in his report and so stated the feeds that were most generally placed on the market that contained this fiber? I take that to be a very important question, looking towards the cost of these feeds and preventing the farmer, who has an abundance of fiber, from purchasing the same; not to take exception to the law but looking to the betterment of the law in the future.

MR. SEXTON: I consider that a very important question from the very fact that the feed manufacturers want to come before our Senate and House committees and say how the feeds shall be mixed for the farmer to be fed, to be in the best condition. We ought to know that ourselves. As we buy pure feeds, which we know we must have, why cannot we be allowed to do our own mixing and put in such fiber as is necessary. As Brother Martin said, why need we buy a whole lot of fiber in with the mixed feeds and have the dealer or manufacturer mix it for us. Why cannot we buy pure feeds and mix in such fiber as is necessary for our own feeds. It seems to me that we will get down to this some day, and I think we will get there, and we wont ask the manufacturer to mix our feeds and put them in shape, as though we did not know how to do it ourselves.

MR. HUTCHISON: I don't like to take your time but I have a friend who is here before this Board. I would like to introduce Mr. Kellogg, who is the chemist of our Bureau.

The CHAIRMAN: I think we had better receive the reports of some of these committees. Is the Committee to wait upon the Governor ready to report?

DR. SCHAEFFER: The Governor was not in, but his secretary said he would notify the Governor and request him to communicate with the Secretary here.

The CHAIRMAN: Is the Committee on Credentials prepared to report at this time?

Mr. Rodgers, as Chairman of the Credential Committee, thereupon presented the following report:

REPORT OF THE COMMITTEE ON CREDENTIALS.

The Committee on Credentials have examined the credentials of the following persons and find them correct and in proper form:

To be elected for three years from January, 1910:

H. G. McGowan, Berks county, Geiger's Mills, Pa.
F. D. Kerrick, Bradford county, Towanda, R. F. D. No. 9.
Jas. Westrick, Cambria county, Patton, R. F. D. No. 2.
Peter Gearhart, Clearfield county, Clearfield, Pa.
J. L. Patterson, Fulton county, McConnellsburg, Pa.
N. M. Biddle, Greene county, Carmichaels, Pa.
Peter B. Cowan, Jefferson county, Brookville, Pa.
Horace Seamans, Lackawanna county, Factoryville, Pa.
Sylvester Shaffer, Lawrence county, New Castle Pa., R. F. D. No. 3.
H. C. Snavely, Lebanon county, Cleona, Pa.
O. W. Abbey, McKean county, Turtle Point, Pa.
M. M. Naginey, Mifflin county, Milroy, Pa.
J. Miles Derr, Montour county, Milton, Pa., R. F. D.
A. T. Holman, Perry county, Millerstown, Pa.
John Shoener, Schuylkill county, New Ringgold, Pa.
Frank A. Davies, Susquehanna county, Montrose, Pa.
Warren E. Perham, Wayne county, Pleasant Mount, Pa.
M. P. Shoemaker, Westmoreland county, Greensburg, Pa.
D. A. Knuppenburg, Wyoming county, Lake Carey, Pa.

These are the gentlemen elected as members of the State Board of Agriculture.

The Pennsylvania Branch of the American Poultry Association have elected W. Theo. Wittman, of Allentown.

The Lebanon County Agricultural and Horticultural Association have elected the following delegates to this meeting:

Clark G. Long, Jonestown, Pa.
Edward Shuey, Lickdale, Pa.
F. R. Fertig, West Lebanon, Pa.
E. S. Ritter, Lawn, Pa.
S. P. Heilman, M. D., Heilmandale, Pa.

The Juniata Valley Poultry, Pet Stock and Agricultural Association have elected J. H. Peachy as their representative.

The Juniata County Agricultural Society have elected the following delegates to this meeting:

Hon. R. E. Groninger.
W. W. Book.
Geo. T. Kepner.

The Committee recommends the admission to the Board of the above named gentlemen as Members and Delegates respectively.

MR. HUTCHISON: I move the report of the Committee be accepted and those gentlemen whose credentials have been reported as correct be accepted as members of the Board.

The CHAIRMAN: I want to ask, does that include Mr. Wittman?

MR. HUTCHISON. Yes, sir.

The CHAIRMAN: The question arises here as to whether the National Association has any privilege to membership in this Board.

MR. RODGERS: We called Mr. Wittman before us and we understood that it was through the different branches of the organization that Mr. Wittman was elected. It was by the branch of the National Organization. Now, we did not understand him to take the place of Mr. Nevius, of the Poultry Association. This is a new organization that we find has presented a delegate here to meet with this Convention.

The SECRETARY: He is here as a delegate then?

The CHAIRMAN: That is why I asked the question.

MR. RODGERS: His credentials do not come as a member of the State Board.

The CHAIRMAN: That is the question I raised. If he is elected a delegate I have nothing more to say; but if he comes as a member of the Board the question is, whether he is eligible, and I should think he was not eligible.

MR. FENSTERMAKER: As a member of the Committee on Credentials I would state that if the Chairman had read the entire report and what we had signed to, it would have solved the entire question.

MR. RODGERS then continued to read from the Committee's Report as follows:

Elected by the Pennsylvania Branch of the American Poultry Association,

W. Theo. Wittman, Allentown, Pa.

We the undersigned committee, have examined the credentials of the above named persons and, finding them regular, recommend their admission to this body.

MATTHEW RODGERS, Chairman.
P. S. FENSTERMAKER, Secretary.
J. F. SEAVY.
E. R. WARBURTON.
D. S. TAYLOR.

MR. FENSTERMAKER: The former Pennsylvania Association is out of business entirely. They have now what they call Branches of the National Association in every State and this is the real, live, acting association in Pennsylvania to-day. He represents these branches in Pennsylvania. We have passed his credentials. They are regular and in proper form, and we recommend his admission to the Board.

The CHAIRMAN: Gentlemen, I don't know that the Chairman should discuss this question, but you will remember that Mr. Nevius comes here by a special Act of the Legislature allowing a member from the Poultry Association, and I have no knowledge or know of any authority that permits the National Association to send a representative or delegate who shall be a member of this organization. This act applies to a Pennsylvania organization and I do not see and cannot interpret the law to allow any but a Pennsylvania organization to be represented here. It required a special Act of Assembly to allow the Poultry Association to have a delegate here and we have no Act of Assembly to allow anybody else, except the Act before us, which plainly says how the member shall be elected. Therefore, if up to my ruling, I would rule that this new organization is not eligible to membership; but I will allow the Board to determine that matter. I would like to hear, however, from the Secretary of Agriculture on that question.

The SECRETARY: I think the position taken by the Chair is entirely correct. The State Poultry Association, by a special Act of Assembly, is entitled to representation upon this Board. I observe, however, from the report of the Committee, that it is stated that this gentleman, W. Theo. Wittman, was elected by the Pennsylvania Branch of the American Poultry Association, and I think possibly it might be well to continue this Committee with instruction to inquire whether these branches, this Pennsylvania Branch of the National Poultry Association, can be regarded as standing as, or taking the place of, or becoming, in fact, the Pennsylvaina Poultry Association, the State Poultry Association. We don't want to do any injustice to anybody, and if these Pennsylvania Branches really take the place of the State Poultry Association, certainly they are entitled to representation. But I think there ought to be further inquiry into this matter.

The CHAIRMAN: I know we would all be glad to have Mr. Wittman a member of our organization if we can get him here legally, but we cannot strain the law in the matter.

MR. SEAVY: I think that it was the understanding of this Committee and all of us that this was the Pennsylvania Branch. It was an organization in this State, only this is a branch of the National or American Association. We considered that it was a Pennsylvania organization, and as the other organization is not in existence, so we supposed that this was taking the place of the Pennsylvania Poultry Association. That is why we accepted the credentials and recommended Mr. Wittman's election as a member.

A Member: Mr. Chairman, I move you that the credentials of this gentlemen be re-committed to the Committee for further investigation.

The SECRETARY: I second that motion.

The CHAIRMAN: You move to amend the original motion to this effect?

The Member: Yes, sir.

The amendment was then put and agreed to.

The original motion, as amended, was then put and agreed to.

The CHAIRMAN. A motion is in order to receive those who come as delegates. We took the members of the Board first, as I understood Mr. Hutchison's motion. Those who were sent here by the different societies we have to receive as delegates. A motion to that effect is in order.

A motion was then made that all whose credentials as representatives of the several societies and associations had been approved by the Committee be received and that they be entitled to the privileges of the floor.

The motion was put and carried and the Chairman announced that their names would be placed on the list as delegates.

The CHAIRMAN: Now, Mr. Hutchison, we agreed to hear further from you.

MR. HUTCHISON: I just wanted to introduce Mr. Kellogg to the Board as our Chief Chemist, who is doing the work of our Bureau, and have him say a word to you.

MR. KELLOGG: I do not know that I can add anything to what our worthy agent has already said. I might add that I am very much pleased to meet you and I assure you that we are doing a splendid work upstairs on the fifth floor of this building and will be very glad to have you come and see us. We have examined over 1,300 samples of feeds this year. We find they are greatly improved and we have driven out a great many inferior articles. Our work is going along quietly without blowing of trumpets. If you find any suspicious feeds on the market we will be glad to have you write to us and let us know of them. We do not have the number of men to cover the State thoroughly; however, we feel that we are being very successful. I assure you it is a pleasure to meet you.

The CHAIRMAN: We are now ready for the Report of the Committee on Wool and Textile Fibres, D. S. Taylor, Chairman.

Mr. Taylor then presented his report as follows:

REPORT OF THE COMMITTEE ON WOOL AND TEXTILE FIBRES.

By D. S. TAYLOR, *Chairman.*

The wool industry of the world is not so great as in former years. The production of wool has decreased in many of the wool-producing sections of the world, and increased in a few—North America, Asia, and Africa, producing more, South America, Europe, Australia and New Zealand producing less. North America, Asia and Africa produced 47,725 pounds more wool in 1906 than in 1903. South America, Europe, Australia and New Zealand produced 108,193 pounds less wool in 1906 than in 1903, showing a loss in production of wool in the world in 1906 of 60,460 pounds.

In 1907, we had in the United States 53,241,282 head of sheep, valued at $204,210,129; in 1908, 54,631,000 sheep valued at $211,736,000, an increase in numbers of 1,389,718, and in value of $7,525,871 in one year. Pennsylvania had on April 1, 1908, 950,000 sheep of shearing age—average weight of fleece 6 pounds—producing 5,700,000 pounds wool washed and unwashed. The average price in the Philadelphia market in 1908, was 32c, showing the value of the wool crop of Pennsylvania in 1908 to be $1,924,000. We find the shrinkage in scouring Pennsylvania wool to be 48 per cent., West Virginia, 48 per cent., and Ohio, 49 per cent. The average weight of fleece—Pennsylvania, 6 pounds, West Virginia, 5½ pounds, and Ohio 6½ pounds.

In 1907, the United States imported 188,305,955 pounds of wool. In 1908, we imported 125,980,524 pounds, or 62,325,431 pounds less in 1908 than 1907. The wool production of the United States in 1908 was 311,138,321 pounds—imported in 1908, 125,980,524 pounds showing 437,118,845 pounds of wool for the American factories.

On April 1, 1908, Pennsylvania had 950,000 sheep of shearing age, producing 5,700,000 pounds of wool washed and unwashed, producing 2,960,000 pounds of scoured wool. Ohio on the same date had 2,000,000 sheep of shearing age, producing 13,000,000 pounds of wool washed and unwashed, and producing 6,630,000 pounds of scoured wool. West Virginia had on the same date 950,000 sheep of shearing age, producing 5,700,000 pounds of wool washed and unwashed, and producing 2,960,000 pounds of scoured wool.

The damage to livestock in Washington county, Pennsylvania, from dogs, in 1908, was $4,906.30; of this amount $4,418.87 was paid for loss of sheep; for dog tags, $55.00; serving notices $10.60, and for killing dogs $88.50. Since 1906 the average amount paid yearly in Washington county for damage to livestock, by dogs, has been $4,702.74; and I am informed by the Chief Clerk of our County Commissioners, that the unpaid claims filed in their office was about $4,000 more than the fund for this purpose was on January 1, 1910.

The wool industry of Pennsylvania appears to be increasing. From 1905 to 1908, the production was increased 600,000 pounds, or 200,000 pounds per year. In 1909, the price of wool increased about 3c per pound, and much of the product was sold while yet on the sheep's back, and offers of last year's prices are now being made to some of our Washington county wool growers, for wool to be shorn in May and June of 1910.

But the cost of producing wool is more now than a few years ago, when we count the increased value of our lands for taxable purposes, the cost of labor and feed. But with all, we think there is more profit in wool and sheep production now than in some other branches of livestock husbandry. We know that the growing of sheep and wool by the land owner is better because it is better for his land, in keeping his land in better condition, distributing the rich droppings from the sheep while on pasture more evenly and on the highest parts of the pasture, as the sheep select the highest part for resting at night. And the permanent pasture and all fields on which sheep are kept have better sets of grass roots than those fields on which cattle are kept. The sheep will eat the young sprouts from land which has been recently cleared from timber, and will keep down weeds, briars, etc., which cattle and other stock will not. And the sheep in going over our land do not tramp the soil so deep and hard as heavier animals. And

we know our soil, climate and other conditions which we have in Western Pennsylvania, Eastern Ohio and West Virginia are such, that in this section we can produce a better grade of fine wool than has yet been produced in any other section of the United States.

On motion duly made, seconded and carried the report was received and filed for publication with the proceedings.

MR. CREASY: I would like to ask one question. Is the sheep industry increasing any? Will we have more sheep the next census commencing in 1910? Will that show more sheep than in 1900?

MR. TAYLOR: From the knowledge I have, I think it will.

The CHAIRMAN: Now the discussion of these reports that we have just heard is in order, if any one has any question to ask concerning the reports we have received. If not we will go to unfinished business. Is there any unfinished business?

The SECRETARY: You will remember that the Memorial Committee appointed at the last session has not reported yet. That would be unfinished business.

The CHAIRMAN: I believe Mr. Blyholder was chairman of that committee.

MR. BLYHOLDER: We are not ready to report at this point. We will be ready this afternoon or at a later session. In fact, we just came in at such a time that we could not get in touch at all.

The CHAIRMAN: The report will be brought before us later. Is there any other unfinished business? If not, we will proceed to new business, and under the head of new business comes the election of officers for the ensuing year. The officers consists of three Vice-Presidents and the Executive Committee. I see by our list that we have eight elected on this committee, and yet it has been my recollection that heretofore we have elected nine at every session, the Secretary of the Board making the tenth member. Am I right?

The SECRETARY: Mr. Chairman, I have no knowledge of any fixed rule, except whatever has been custom.

MR. KAHLER: I think we have in the past elected a full Board and elected nine, and the Secretary is an ex-officio member.

The CHAIRMAN: Well then, the Governor being ex-officio President, we will proceed to the election of Vice-Presidents, of which there are three to be elected, nominations for which are now in order.

MR. HUTCHISON: I nominate Mr. John C. Weller, of Somerset county.

MR. FENSTERMAKER: I nominate Henry C. Snavely, of Lebanon county.

A Member: I nominate S. S. Blyholder, of Armstrong county.

On motion made and agreed to, the nominations were closed.

MR. HUTCHISON: I move the Secretary cast the ballot for the gentlemen nominated.

The motion was seconded and agreed to.

The SECRETARY: Mr. Chairman, in accordance with the instructions of the Board I do cast the ballot for Vice-Presidents for John C. Weller, of Somerset county, H. C. Snavely, of Lebanon county, and S. S. Blyholder, of Armstrong county.

The CHAIRMAN: I declare these gentlemen elected Vice-Presidents of the Board.

Nominations are now in order for members of the Executive Committee, nine to be elected.

The following were then nominated as members of the Executive Committee:

Mr. Fenstermaker, of Lehigh county.
Mr. Rodgers, of Juniata county.
Mr. Kahler, of Lycoming county.
Mr. Knuppenburg, of Wyoming county.
Mr. Holman, of Perry county.
Mr. McGowan, of Berks county.
Mr. Glover, of Union county.
Mr. Shoemaker, of Westmoreland county.
Mr. Barnes, of York county.

MR. HUTCHISON: I move the nominations be closed, and that the Secretary cast the ballot for the gentlemen nominated.

The motion was agreed to.

The SECRETARY: Mr. Chairman: Complying with the instructions of the Board, I cast the ballot for members of the Executive Committee for Messrs. Fenstermaker, Rodgers, Kahler, Knuppenburg, Holman, McGowan, Glover, Shoemaker and Barnes.

The CHAIRMAN: I declare these gentlemen elected members of the Executive Committee. The Executive Committee at their meeting will name the Advisory Committee and the Consulting Specialists.

Now, gentlemen, I think the fixing of the place of our Summer Meeting comes under the head of new business.

MR. SHOEMAKER: On behalf of Westmoreland county, I want to invite the meeting to come to Greensburg. The place is easy of access and we have ample hotel accommodations. The Commissioners have consented to give us the use of the Court House and the town will be ours if we want it.

The CHAIRMAN: Any other places?

MR. BARTLEY: I want to extend an invitation to this Agricultural Board to have our next meeting in Butler. I have made arrangements there to have the Court House. We have all the railroad facilities there that are necessary. You can arrive at Butler in any direction. We have also two trolley lines from Pittsburg, by way of New Castle, coming into Butler. I can say this much for Butler: We have good hotels; just as good as any in the State. We will treat you well. It is the wrong time of the year to feed you buckwheat cakes, but we will give you the best we have over there. I would ask the Board to consider this place, Butler.

The CHAIRMAN: Any other places to be named; any other invitations?

DEPUTY SECRETARY MARTIN: I want to supplement what I may say by stating, that personally we have no preference. In deference to the management of the State College and Experimental Station, I should say that Dean Hunt called upon me yesterday and extended a cordial invitation from the College to meet at that place this time. I do not want to be understood in making this statement that we are expressing any preference at all. We have no preference. I am simply stating this in justice to Dean Hunt of the State College, that this request or invitation was given in person.

The CHAIRMAN: Any other places to be named or any other remarks? The places named are Greensburg, Butler and State College.

MR. BLYHOLDER: I move you that we accept the invitation from Greensburg for the next meeting.

The CHAIRMAN: I think we are obliged to ballot upon that question by calling the roll and each one responding, naming the place he prefers. This has been our custom, and I think the proper way to do it.

I would like to state that I am very well acquainted with the conditions at Butler, and I know they are interested there. It is easy of access and a very desirable place to meet, without saying anything about any other place.

MR. BLYHOLDER: Greensburg is the same; on the main line of the Pennsylvania Railroad.

The CHAIRMAN: Before Pittsburg is named I think we had better proceed to vote.

DR. HUNT: I simply want to express my thanks to Director Martin and state that you always have an invitation to come to State College. We will be glad to have you come any time. We believe that we have at State College about the 1st of June more of interest to the Institute workers than we have at any other time in the year, and at the same time we hope you will see your way clear to come to State College at that time. We think it will be of benefit to us and we are sure of that, and we believe it will be a benefit to the Members of the State Board of Agriculture. But I rise to say that we do not wish to embarass any of our friends with regard to going to State College. We are not pressing the invitation upon the Board at this time. We simply want to have it understood that we will be pleased to have you come to State College, but are not asking or urging it upon you as against the other places that may have claims upon your attention.

The CHAIRMAN: The students will be there and the College in session. Can you entertain a body of that kind independent of the school?

DR. HUNT: Absolutely so, without any difficulty whatever.

DEPUTY SECRETARY MARTIN: It is pretty evident that there is a little rivalry in Western Pennsylvania from two very important counties. I am acquainted with both of these localities and am frank to say that it is pretty evened up so far as conditions are concerned, and it is rather pleasing to learn that two of these important agricultural sections are so anxious for this annual meeting of the State Board, together with the Farmers' Institute workers of the State. Western Pennsylvania is progressive, and yet it is understood that she is in need of more progressive or advanced agriculture, and hence I am gratified to learn, since listening to the remarks of Dean Hunt, that you feel quite free to make your choice, and I want it to be so. Whatever place you select we will gladly acquiesce in the decision of the Board.

On motion made and agreed to, the roll was called and vote cast for place of next meeting.

The SECRETARY: Mr. Chairman, I wish to announce the vote as follows: Greensburg, 6; Butler, 22; State College, 11.

The CHAIRMAN: Butler, having received the majority of all the votes cast, is declared to be place for the next meeting.

MR. McGOWAN: I would like to announce that the Committee on Legislation will meet at Mr. Martin's office at one o'clock, or as near after as you can get there.

MR. RODGERS: Mr. Chairman, I wish to announce that the Committee on Credentials will meet in Secretary Critchfield's office at 1.15 o'clock and would like Mr. Wittman to appear before us.

The SECRETARY: Mr. Chairman, since our last meeting of the Board, another member has been called from labor to reward, and possibly we might want to refer that matter to the committee, the committee already appointed, the Memorial Committee, if it be thought well to do so, or it may be thought better to refer it to another entirely new committee that can be appointed. I mention this because it has been announced that the committee will meet before our next session.

I move you, Mr. Chairman, in order to bring the matter up, that the committee be instructed to prepare suitable resolutions upon the death of Mr. Schwarz, late member from Monroe county.

The motion was seconded and agreed to.

The SECRETARY: Mr. Chairman, I would like to make another motion, and would like to state the reason for it before I do so. I stated this morning that the Governor was anxious to spend as much time with us as possible. He has just sent word that he can come in at one o'clock and we have fixed our afternoon session at 1.30. We will be able to adjourn in a few minutes and that would give him the opportunity of having just a half hour more with us than he could under other circumstances. I therefore move you that when we adjourn, we adjourn to meet at 1.00 o'clock instead of 1.30.

The motion was seconded and agreed to.

The SECRETARY: I just want to make an announcement. We have over in the old Executive Building a very excellent educational and industrial museum. The young lady who has charge has been over here to ask that we come sometime in a body if possible to visit the museum. She will be able to show us very many things that are—I was going to say of considerable—I will say great importance to agriculture, the subject in which we are all interested and I want you to think over this matter, and if you can think of the time when we can go over and spend a half hour I will be glad if that arrangement can be made. I know we will all feel paid for the time spent if we are able to go over there.

MR. HUTCHISON: I would just like to state that Mr. Spicer, one of the chemists, will be on duty here at this exhibit of feeds and grain at the other end of the room, and we would like at sometime when convenient if you would look over it. We have prepared this for your benefit and education, and any questions you may wish to ask will be gladly answered, and if you wish any bulletins on the work of last year, we will gladly furnish them. They give you the analysis of the different samples taken.

The CHAIRMAN: Has the Executive Committee any announcement of their meeting to make? They are expected to meet and name the Advisory Committee and Consulting Specialists.

MR. FENSTERMAKER: (Chairman of the Executive Committee) I would like to meet the Committee right after the adjournment of the afternoon session. We can do the work here, I think.

The CHAIRMAN: This afternoon the newly elected officers will take charge of the meeting here and preside.

The SECRETARY: I would like to make another announcement. You will note that on this afternoon's program, as arranged, Dr. Armsby is to speak upon the subject of "Pure Bred vs. Scrub Steers." Dr. Armsby would like to make his lecture, at least partially, an illustrated lecture and so the lantern and the canvass has been prepared, and I believe it is understood between Dr. Armsby and Dr. Hunt that they will exchange places. This is satisfactory to both gentlemen. And Dr. Hunt will take the period on the program for Dr. Armsby and Dr. Armsby will take the period assigned to Dr. Hunt. I wanted to make this announcement in advance so that you will know just exactly what is to be served when you come in from getting your regular meal. Pure bred beef will be served this evening.

The CHAIRMAN: Any other announcement or remarks.

GENERAL BEAVER: I caught an idea from a remark made a few moments ago. I failed to rise to enforce the invitation to the Board to come to State College for two or three reasons. In the first place, I would rather like to go to Butler myself if I was not expected to be at Ebensburg at that time. In the next place I wanted to tell you that if you determined to go to Butler that you would find a good country church about nine miles from there that my friend Greer drove me to. A little fellow by the name of McMillan is the

pastor and it is right through an interesting stretch of country that you go to reach it, and I think it would do the members of the State Board of Agriculture just as much good as it did me, if they are to be there over Sunday, to go to church. The day I was there the most of the churches were closed and I said, Greer, let us go to some country church. I was raised in the country church and was accustomed to two good sermons, one in the morning and the other in the afternoon. So I did not do what, as President of the Board of Trustees of State College, I should have done. I soon saw that you had it set up for Butler and was no use.

But I am saying this as preliminary to a motion that I would like to make. There is another reason why I did not rise, and that is that the facilities for getting to the College are not what they ought to be. We ought to have a railroad from Tyrone to Montandon, connecting the Pennsylvania and the Philadelphia and Erie roads. We have the Pennsylvania system at both ends but we have a little gap of ten miles that has not been built. If the gap were closed I think you ought to come to State College at least once a year; because agriculture is growing tremenduously and we catch the growth there a little earlier than you do in most places, and perhaps if you catch it at other places you can impart the growth and development to those in charge of agriculture at the State College. Now we are endeavoring to establish a systematic campaign to teach the Pennsylvania Railroad that whenever they can increase the growth of corn in Pennsylvania so that the result of tillage is what they claim in Iowa, 10 bushels to the acre, you can increase the production of wheat 5 bushels to the acre, you can do the same in Pennsylvania by the proper advanced and scientific methods. If we can grow flax which can be turned into linen the next day, as they are doing in this country now, instead of taking six months to rot the vegetable matter out of the fiber and then make linen out of it, we will make linen cheaper than Great Britain inside of five years in this country. These things are worth learning and the State Board of Agriculture, above every other organization in Pennsylvania, wants to be in the front rank of agriculture, and if it is getting there and wants to keep there it has got to keep in touch, not only with the practical development of agriculture, but the scientific development of it. And so, a visit every year to State College would be a great advantage to you and, of course, reflectively, a great advantage to the College. Now, what I would like the State Board of Agriculture to do is to join with the Patrons of Husbandry in their effort to bridge that little chasm of eight or ten miles. I suppose the direct result will not appear to the Pennsylvania Railroad, but if they get the benefits of the efforts of the Department of Agiculture and the School of Agriculture and Experiment Station at State College diffused over this entire State, as they are endeavoring to do by their agricultural trains, I am sure that it will pay them and that they will receive a large return on the invesment, taking the State altogether. And so I would like to ask you to join us. I have not prepared any resolution. It just occurred to me it would run like this: That the State Board of Agriculture unites in the desire of other organizations of like character in asking the Pennsylvania Railroad to connect the railroad from Tyrone, on the Tyrone and Lewisburg road, via Fairbrook or Benore, through State College, to Oak Hill or Lemont on the Philadelphia and Erie road,

until about the last of July, and I want to publish this news as widely as possible. We will charge no tuition. We will take every teacher there who wants to come and give board at the rate of $3.00 per week and room at the rate of $1.00 per week, and I presume and announce that the whole cost of this six weeks session will not exceed $35.00 to any teacher entering, excluding the railroad fare. We are delightfully situated, over 1,200 feet above sea level, average temperature, cool in summer time, and we shall have a very pleasant session during all the six weeks. Because it will be a summer session, we will take the instructors out of our own college. Many country teachers have not had the opportunity to go to college, and many of them could not get into college, therefore we will require no entrance examination of any kind. Any teacher who can read and write the English language will be admitted there and have the benefits of this six weeks school.

What shall we teach? We shall teach courses in elementary agriculture, courses in botany, horticulture as well as in domestic economy for the women teachers, housekeeping, cooking, sewing and dressmaking, because all these things are going to be taught in the schools, and also manual training; so that the teacher can go back to the school and instruct all the better; in physics, in chemistry and simply in all things that will make the schools useful. And in speaking on how to make the schools of some service, I said to those who were present at the State Grange last winter, that the boy may go through the school and pass every subject with high credit to himself and the result will be that if you put a direct question to him about spraying a tree,—and he is not taught one thing in that whole school curriculum,—and he would not know whether you would spray it with Florida water or pump water; and the girl can take the prize in English and not know how to decorate her house or make bread. We are going to teach all that.

But the first thing is to teach the teacher to do those things; and our laboratory and shops are there to teach the teacher, and then the boy will have some counter-action against the attractions of the city. Now, what can we do? Why not a little bit of counter-irritation in learning something that will turn him to the farm instead of to the city; and by and by if he feels that they are teaching things in school that make intelligent clod hoppers, he will be willing to become one if he finds it will take as much brains as it does to go along with the conditions in the cities, and then he will begin to again turn to the farm. Therefore we are going to begin to teach the teachers these things first. How many teachers out of the thousands in Pennsylvania can we get to come there? If I were on that Board of Education I would like to raise enough of money by some kind of arrangement for paying that teacher's expenses, if it can be done, to send the teacher there for six weeks. I am laying it before you. If anybody knows a teacher that will be interested, we will send you catalogues or give us their names. We are offering it free. Now, will the people do their share?

The SECRETARY: Mr. Chairman, we have already given expression upon a matter upon which we are glad to, the resolution of Governor Beaver. And it is quite possible, after hearing this very excellent little plea for the summer school, we might feel like putting

giving a through line, via State College, from Montandon to Tyrone. If you will kindly do that, and have the Secretary authorized to transmit it to the authorities of the Pennsylvania Railroad at Philadelphia, I am very sure that the result would be helpful and that we would probably get consideration sooner, because it will come in time, of course, because we intend to keep at it. It will be better if the different elements interested in it unite, and you are interested in it just as much as anybody in Pennsylvania; and so I would make the motion that we ask the Pennsylvania Railroad to build the connection between either Oak Hill or Lemont and Fairbrook, or whatever point they may desire to connect these two independent railroads that were intended to be one and will be one sometime.

MR. HUTCHISON: I second the motion.

The motion was put and agreed to.

MR. HILL: In connection with this, I may say that the State Grange provided for a committee to present its resolution to the Board of Directors of the Pennsylvania Railroad, and just as a suggestion I might say that it might perhaps be wise if the State Board of Agriculture would have its resolution presented through the same agency, of which Brother Jason Sexton is chairman.

The SECRETARY: Mr. Chairman, we are fortunate in having a number of gentlemen with us this morning from whom we are always glad to hear a word. Now, Dr. Sparks, of the State College is here and I know that he will have some message to give us, and perhaps he had better have the opportunity of saying a few words before we adjourn for fear we will not have him again.

DR. SPARKS: Gentlemen and Fellow Members of the Board: I regret that I have not been able to take such an active part in the meeting of the Board as I would like, but we ornaments of society are called on in many different places. Now, you know a great deal and have heard a great deal of the work being done by this institution of yours, that I have the honor to represent, for the rural and agriculture elements and interests over the State, and I want, just in a word, to explain something and describe something that is not quite so apparent. The effect might be called indirect effect or result, and yet I am satisfied is a most important thing.

We have there a plant worth two million dollars belonging to the State, to you, the tax-payers of the State, supported by the National government and State government. Now that plant, according to the regular college year, would lie idle from the middle of June to the middle of September because of regular custom of colleges having a vacation at this eason of the year. Now, I ask you what man, owning an industrial plant in which so much was invested, would think of closing up his plant from the middle of June until the middle of September; and it does not, therefore, seem economical to do that with our institution. Now on the other hand, we know that there is a constant demand for the betterment of the country school; and the question is, How can the College do something for the schools of Pennsylvania? We have announced, and pamphlets have been issued, a summer school for teachers, to be composed of teachers only for the six weeks; not all the summer, from about the middle of June

ourselves upon record on this matter and encourage the teachers to attend. There are a great many things on which we ought to have a Committee on Resolutions, and I therefore move you, that the Committee on Resolutions be appointed at this time, which shall prepare resolutions to be acted upon before we finally adjourn. I would suggest a committtee of five.

The motion was seconded and carried.

The CHAIRMAN: I will appoint on this Committee on Resolutions D. A. Knuppenburg, Wyoming county, Chairman; A. P. Young, Columbia county; John A. Woodward, Centre county; I. A. Eschbach, Northumberland county; H. C. Snavely, Lebanon county.

MR. FENSTERMAKER: Mr. Chairman, I would like to inquire of Dr. Sparks whether this invitation is limited to teachers exclusively to attend this summer course.

DR. SPARKS: It is limited this way, to teachers holding certificates granted by the State of Pennsylvania, where our taxes come from; but any teacher engaged in teaching in Pennsylvania is admitted without any tuition whatever. One not engaged in teaching in Pennsylvania or not having a certificate or not having taught, would be admitted upon the payment of a slight tuition; I think $2.00 for the six weeks.

The CHAIRMAN: Is there any other business before the Board? If not, I want to call your attention to the meeting at one o'clock. Try to be prompt, as the Governor will be here at one o'clock.

On motion adjourned at 11.45 A. M. to meet at 1.00 P. M.

Wednesday Afternoon, January 26, 1910, 1.15 P. M.

Governor Stuart presiding.

The CHAIRMAN: You will please come to order. What is your pleasure?

MR. HERR: I move you that William T. Creasy, William F. Hill and A. N. Deitrich be admitted to this meeting as delegates of the Pennsylvania State Grange.

MR. McGOWAN: I would add the name of E. M. Zerr, of Geigertown.

The motion was then seconded, put and agreed to.

The CHAIRMAN: Gentlemen, I want to say what pleasure I have in being here and regret that I am not able to remain with you all through your session. I have some important business engagements upstairs that will require me to return to my office within an hour.

The first thing upon the program is the Report of the Committee on Dairy and Dairy Products, by Dr. M. E. Conard. Is he here?

Dr. Conard not being here, the next thing on the program is the Report of the Botanist, Prof. W. A. Buckhout, State College.

The SECRETARY: Prof. Buckhout will not be here. His report has been sent to me. It can be read or received for printing in the proceedings.

MR. HUTCHISON: I move that it be received and printed with the proceedings.

MR. BARNES: I second the motion.

The motion was put and agreed to.

Prof. Buckhout's report follows:

REPORT OF THE BOTANIST.

By PROF. W. A. BUCKHOUT, *State College, Pa.*

The year 1909 has not materially differed from those preceding in respect to botanical inquiries from farmers, nor in any matter concerning economic plants. History here, as elsewhere, but repeats itself. Hence I shall but briefly summarize a few matters which seem to me of particular interest and value, and will bear repeating.

1. The necessity for good seed in farm and garden cropping is as imperative as ever.

To determine good seed is a prime requisite. Various samples have been submitted to me. Reply has tried to emphasize two points: (1) A germination test should be made in order to show the percentage of living seeds, capable of growing quickly and vigorously when placed under the germinating influences. This takes some few days or weeks to determine. (2) Careful examination of a sample will show the percentage of seed true to name and also of foul seed or dirt with which it may be adulterated. Since the foul seeds are apt to be of weeds it is also desirable to know their names and the probable amount of injury which they may cause if they are allowed to grow and get a foothold. For general purposes and in many instances this can be done in a few hours.

Correspondence discloses so great ignorance of these matters that I feel warranted in again calling attention to them and urging increased and more continuous alertness on the part of farmers in the selection and use of seed.

Owing to the large use of clover and alfalfa and the wide range of source of these smaller farm seeds, they are much more frequently submitted for examination than any others. Dodder, Russian thistle and Bur-grass have been the most injurious of the accidental adulterations. The last mentioned is easily detected because of its large size and prickly character; hence it is not common. The other two being smaller are both more difficult to detect and more difficult to remove. This is where the need of seed examination comes in. Any one who sows dodder infested seed must expect more or less dodder in his fields. Fortunately it is not a particularly difficult weed to eradicate, but it takes time and labor; these are valuable commodities and no prudent man chooses to waste them.

Of the purposed adulterations of seeds, I am glad to say no cases have come to my attention. It is fair to assume that they are becoming less frequent owing to the vigorous measures which are controlling trade in seeds and food products of all kinds. The farmer may well congratulate himself on this, but let him not relax his own vigilance. His own ignorance and inattention are still loop holes through which he is defrauded. There is no sharp line of separation between accidental and purposed seed adulteration. Careless and indifferent dealers will sell impure seed as long as they find purchasers.

Red clover and Alfalfa are particularly liable to contain weed seeds. Dodder sometimes makes ten or more per cent. in the uncleaned seed. Unless this is pretty carefully screened out it is easy to forecast the result,—A dodder infested crop even though every other condition is perfect. Cleaning is a tedious process, but there is no escape from it.

2. On the general subject of weed destruction, inquiries still come in large numbers and with provoking frequency. Provoking, I say, because the inquirer so commonly seems to infer that his weed experience is something new and also that there must be some quick, short-hand means of exterminating weeds at little cost and trouble. Neither is true. While new weeds occasionally appear, it is rare; and the practical difficulties are such as are encountered on hundreds of farms. Sometimes it will pay to dig out and destroy individual weeds; generally it will not. Sometimes weeds can be destroyed by spraying with copperas, generally, in our district, that is impracticable. Generally, successful weed destruction means two things: First: thorough plowing and cultivation with hoed crops; second, following this up after two or three years by seeding to grass or grain. The more thorough the cultivation and the more careful the seeding, the more likelihood of getting rid of the weeds. Seeding should always be heavy and the ground should be liberally manured. The object throughout is to weaken the weeds by frequent cultivation and then choke them out by the more vigorous growth of some useful plants.

Simple as this appears any practical man knows that it means work, and work intelligently done. Nevertheless it is perfectly feasible and is, moreover, the only practicable method in the majority of cases.

Minor details in the process will vary according to circumstances in each case, but the general principles are the same in all. The most troublesome cases are such as garlic where the weed chiefly depends on its tubers for continuance, or the great seed producing weeds like thistles and wild carrot, which your easy going neighbors and indifferent road supervisors allow to flourish, apparently for the express purpose of seeding your fields and nullifying your care and labor.

Much interest still prevails in so-called special crops and the gullible public, ever on the lookout for some quick way of making money, is easily duped. I refer particularly to such plants as ginseng, golden seal and other drugs. It is indisputable that these wild plants can be successfully cultivated and that they are somewhat improved and the crop increased under cultivation, but they are so different from ordinary farm and garden crops and required such nicety of care and attention that they are in a special class by themselves. It is idle to talk of growing them by the acre and handling them as one would celery or corn.

The popular accounts of profit derived from these crops are generally founded upon very small gardens which yielded at the rate of so much per acre. The fallacy of this method of computation should be obvious to every intelligent man. Sales from such gardens are, moreover, generally of seeds and small roots for replanting. The prices of this stock are generally disproportionately high so long as the interest of the purchasers can be bolstered up.

If any one desires to engage in this cultivation he should thoroughly inform himself before hand regarding all the details of planting and management. The dealers, of course, will be only too glad to give him this information. But if he is wise he will seek the advice of disinterested parties. I know nothing better than Bulletin No. 27 of our own State Department of Agriculture "The Cultivation of American Ginseng in Pennsylvania," by Professor George C. Butz, if it is still in print.* A similar bulletin, No. 16, Division of Botany, U. S. Department of Agriculture, covers much the same ground. It can be had of the Superintendent of Documents, Washington, D. C., for a few cents.

I cannot too strongly recommend and urge our farmers and cultivators of all sorts to acquaint themselves with the public literature on various topics connected with their business. I find very few people have any idea of the activities of the U. S. Department of Agriculture and the range of its publications. There are few subjects which have not received attention and study from its experts and upon which they have not written in clear and concise directions. Much of this is available to any applicant. The series of Farmers' Bulletins now numbers over three hundred and fifty. While some of the earlier ones are out of print all the others can be had gratis on application. A small charge is made for bulletins of other series, but it is so small as to be insignificant compared with the completeness and value of their information. No one can keep fully abreast of the times without being familiar with these documents.

In conclusion, I wish again to offer the facilities of the Botanical Department of the Pennsylvania State College to any who wish information on botanical and nearly allied points. We seem to be on the eve of a more intelligent and intensive agriculture. Toward this your Agricultural College ought to be able to offer a very helpful hand.

The CHAIRMAN: The next is the Report of the Pomologist, Mr. Gabriel Hiester, of Harrisburg, Pa. Is Mr. Hiester here? He does not appear to be.

The next on the program is the Report of the Chemist, Dr. William Frear, of State College.

Dr. Frear then presented his report as follows:

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*This Bulletin is out of print.

REPORT OF THE CHEMIST.

By DR. WILLIAM FREAR, *State College, Pa.*

RELATIONS OF FERTILIZERS TO ROOT DEVELOPMENT.

In talking about plant production in its various phases, we rarely take the whole plant into consideration. Our thoughts are confined to the yield of grain or fruit, or at most to the aerial parts of the plant. Only in the case of root or tuber crops do we give attention to the subterraneous part of the crop, and even then it is upon the marketable fraction of this part that we dwell. Yet we all realize clearly that unless there be a satisfactory development of the root system and a proper performance of its functions, whereby especially the moisture and mineral food supplies of the soil are brought into the plant, we can not rationally hope for a proper development of the stalk and grain or fruit.

All who have weeded a garden, or thinned a corn crop, know something about the root systems of plants, and have more or less definite ideas upon the subject of their development and of certain major differences that plants of different families exhibit in these particulars. Few who have pulled weeds have failed to distinguish between plants that form thick tap roots and those that branch out near the surface of the soil into a clump of fibrous branches, the multiple roots. Most would recognize in these two classes the two groups of deep and shallow rooted plants.

Those who have observed more closely have noted that the surfaces of the thicker, older roots are coated with a dense, corky outer layer; while the slender white fibers of later formation are usually marked by the presence of a greater or smaller number of root hairs projecting at right angles from the axis of these slender young fibers. That these younger fibers alone possess absorptive power for the moisture and plant foods of the soil, is known to comparatively few of those who grow plants for their life work.

The studies of the last half-century have brought to light a number of facts of interest regarding plant roots in their relations to methods of crop management and to crop yield. Thus the average of about thirty root washing experiments, compiled by the writer, show that in the eastern part of the United States the weight of the dry matter of the roots and short stubble varies from one-third to one-half that of the top of the plant; or in other words, that of the entire weight of dry matter in the mature crop, one-fourth to one-third goes to form the root system, in the case of grain crops and grasses.

Most cultivators have observed that in the case of very young plants the growth of the root is more rapid than that of the top; but the notions on this subject are usually too vague to be expressed in figures. During the past few decades a number of investigators have studied the matter upon crops or field growth. In general, the results ob-

tained accord quite fairly with those gained, some years ago, by the writer in such study of the growth of the corn crop. The plants grown from kernels planted two inches deep in a rich loamy soil, had, at the end of two weeks, 178 pounds of roots for each 100 pounds of top; at the end of four weeks, after two weeks further development of both roots and tops, there were only 42 pounds of roots for each 100 pounds of top; or, in other words, during the second two weeks of growth the proportion of root top had fallen to one-fourth of that found at the end of the first two weeks; or, in still different terms, at the close of the second week there was for each four pounds of top, a root system of seven pounds to gather food and drink for it; at the end of the fourth week, a root system of only 1.6 pounds for like service. What fraction of the total root system was in condition for such service at the two periods named, has, so far as I know, never been ascertained.

Again, it is a matter of common observation that plant roots go far in search, as it is usually expressed, for water and mineral food when these are located at points remote from the place where the seed was planted; whereas, if a body of plant food, such as a bone or a lump of manure, be found near at hand, the roots will mass themselves densely about the object without forming any widely extended system pervading the entire weed-bed; and will in that case be short and fleshy, rather than long and slender as they are when they stretch out toward a remote food or water supply.

Further, those who have studied, by means of water cultures, the behavior of plants as they are deprived of one or another of the materials commonly supplied as foods by the soil, have noted very striking variations in the character of the root systems developed by the same plant under conditions identical with the exception of the absence of one or another food element. For example, the roots of a healthy, sprouted corn kernel show, when dipping into a complete culture solution containing a suitable amount of nitrogen and of the several essential mineral foods, a slightly branched system of stout, yellowish roots of no great length; but when dipping into a solution equal in volume to the former and like it in all respects save that lime compounds are absent, form a widely extended, highly branched system of very slender, intensely white roots. These observations have led, nevertheless, to few suggestions of importance to the practical farmer.

Quite recently, however, several studies have been made upon the influence of fertilizers upon root development that merit the attention of the crop grower, more because they throw light upon the action of fertilizers than because they have, as yet, been made the basis of new rules of practice. It is to one of these, reported some months ago from the Agricultural Experiment Station, at Darmstadt, Germany, by Max Wagner, that your attention is especially invited, and more particularly to those of its results that exhibit the effects of fertilizers upon the quantities of roots and tops developed by the several crops tested,—oats, barley, mustard and buckwheat.

The crops were grown in pots, upon a soil of coarse texture, well supplied with lime, but quite deficient in nitrogen, potash, and phosphoric acid. Water was added at the outset in favorable quantity, which was maintained by daily additions sufficient to make up for the losses by evaporation from soil and crop. Of the fertilizers used, the

phosphoric acid and parts of the potash and nitrogen were thoroughly mixed with the soil at the outstart, a top dressing of the remaining potash and nitrogen being given later. The quantities given were normal for such experiments. At the conclusion of the period of growth, the tops were cut off close to the ground, dried, weighed, and analyzed; the roots were carefully washed out, and likewise dried, weighed, and analyzed. From the analyses and weighings it was found that the mature plants of each of the crops, except the buckwheat, had taken up practically all of the potash and nitrogen supplied respectively in the form of potash salts and nitrates, while but half of the phosphoric acid added in superphosphate and Thomas slag (basic slag) had been taken up.

The yields in grams of dry matter in the tops and roots of the several mature crops differently fertilized, are shown in the following table; and also the ratio of dry root to dry top, the latter being taken as 100:

Crop and Treatment.	Top.	Root.	Ratio.
Oats.			
Unfertilized,	18.65	10.87	58
Complete fertilizer,	158.41	55.70	35
Complete fertilizer, without phosphoric acid,	109.88	34.56	31
Complete fertilizer, without potash,	110.90	44.66	40
Complete fertilizer, without nitrogen,	17.03	9.21	54
Barley.			
Unfertilized,	9.95	8.60	86
Complete fertilizer,	151.74	58.40	38
Complete fertilizer, without phosphoric acid,	94.13	37.43	40
Complete fertilizer, without potash,	76.50	28.75	38
Complete fertilizer, without nitrogen,	14.43	10.20	71
Mustard.			
Unfertilized,	11.53	4.44	39
Complete fertilizer,	100.30	21.14	21
Complete fertilizer, without phosphoric acid,	81.91	15.21	19
Complete fertilizer, without potash,	75.74	11.48	15
Complete fertilizer, without nitrogen,	11.40	3.69	32
Buckwheat.			
Unfertilized,	13.23	3.35	25
Complete fertilizer,	127.95	19.60	15
Complete fertilizer, without phosphoric acid,	87.20	15.85	18
Complete fertilizer, without potash,	110.75	18.20	16
Complete fertilizer, without nitrogen,	7.88	2.28	29

These results show that, although the phosphoric acid and potash were both helpful to crop increase, the vital deficiency was that of nitrogen. They further show that lack of nitrogen, whether because no fertilizer at all was given or because only a non-nitrogenous fertilizer was used, led a relatively large root development as compared with that of the top. Wagner noted that in the absence of nitrogen, the root mass was large and composed of long fibers, whereas, when the nourishment was sufficient, there was formed a relatively short, compact root net. He infers, therefore, that the consequence of abundant fertilization is, within certain limits, more economical than that from small applications, because the former produces relatively more top.

This law of economy, he says, controls the formation of plant organs in favor of the development of the fruit,—the maintenance of the species. When food is abundant in the soil, the plant spends little building material upon the root, to save it for the top. The roots are only secondary nutritive organs; they have the duty of seeking out the raw materials, taking them up and transferring them to the leaves. If this labor of the roots is rendered easy by the presence of abundant soil nutriment, it is not needful to extend these organs so far, the building material is saved, and is productively used in the stronger upbuilding of the more important nutritive organs proper, the assimilation apparatus.

In view of this fact it may be said, that it is rational to provide the plant so abundantly with nutritive salts that it may develop normally, that is, so as to employ most of the available nutriment for the formation of the productive organs proper, the foliage, and to use correspondingly less of it for the formation of roots.

Wagner notes that plants are able, in some measure, to readjust quickly their ratio of root to top as surrounding food conditions may require, and thus to survive a change in such conditions; also that some plants can effect this readjustment more readily and fully than others, and that such are most fit to survive and experience the widest distribution upon different soils. Finally, he notes that a difference in the root to top ratios may be fixed by heredity under a particular environment and that thus the several varieties of the same species may come to exhibit distinctly different powers of survival under adverse conditions, such as Atterburg noted in the case of various barley races growing upon soils deficient in potash.

It is possibly unwise to generalize too broadly upon the basis of so limited a volume of data. We may safely note, however, that these experiments raise many questions of practical importance relative to the control of plant development by the use of fertilizers, the production of varieties suited to particular environments, and the residual effects of various systems of fertilization upon the composition of the soil, more particularly with reference to the amount and distribution of its humus and of the associated soil bacteria.

On motion duly made, Dr. Frear's report was received and filed for publication with the proceedings.

The CHAIRMAN: The next is the Report of the Sanitarian, Dr. H. D. Moore, of New Lexington, Pa.

The SECRETARY: Dr. Moore has been deprived of the privilege of coming here, but he has sent his report which I do not have here for the reason that we have been ordering that they be received and printed with the proceedings.

The CHAIRMAN: What is your pleasure in regard to Dr. Moore's Report?

It was moved, seconded and agreed to that the report be received and filed for publication with the proceedings.

Dr. Moore's report is as follows:

REPORT OF THE SANITARIAN.

By DR. H. D. MOORE, *New Lexington, Pa.*

Since the passage of the Act of the General Assembly of 1905 creating a Department of Health, and the subsequent appointment of a Commissioner of Health, with authority to issue rules and orders for the betterment of the health of the people, and power to enforce these rules and orders, and since the work of the Department, under the guidance of the Commissioner of Health, has been conducted so wisely and systematically, and has progressed so rapidly, the public in general, and the people of the agricultural districts in particular, have learned more than ever before in regard to sanitation, and how to avoid contagious diseases and care for those who fall under their power.

While the medical practitioners in the rural districts, were not oblivious to the unsanitary conditions in their fields of practice, the advice that certain things should be done to improve the sanitary conditions in, and around the home, was seldom heeded; but when the local health officer, under instructions from the Commissioner of Health appears upon the scene, with the "you must do it" order, there is no alternative but to obey. This relates more particularly to the pollution of streams. Until quite recently the popular idea was that the most important use of the streams was to carry away waste matter from cities, towns and the farm, and that the air and sunlight, and sand over which the water passed would soon purify them, which is more or less true.

The farm is a minature municipality in itself, with the farmer as mayor or burgess, and filling all the other offices of a municipality himself, excepting that of boss, in case he has a wife. As a rule, the agriculturist is not only a working man, but also a reading man, observing, and quick to take up new ideas not only relating to agriculture, but anything pertaining to the health and welfare of his family. The time has long since passed, when a case of sickness in the family is regarded as a Providential affliction.

In a case of sickness now, the first questions arising are, what is the cause, or from whence the infection? With the aid of the family physician these are sought and removed as far as possible, and if necessary, the Commissioner of Health sends his agents to assist.

When we compare the modern houses with the old farm houses, in which many of us were brought up, we wonder that we are here. The house was located below the spring, the walls were laid in mortar made of clay and water, which the rats cleaned out in a few years. A large water trough in which to cool milk was put across one side of the cellar, and boards laid loosely on cross pieces for a floor, which, as a result of scrubbing and water underneath, soon filled up to the boards with a muck that "squashed" through the crevices every

time they were stepped upon. The redeeming feature of these houses was, that they were without plaster or paper lining, and having no weather strips at doors and windows, plenty of fresh air found its way into the living rooms. Later, lime and sand replaced clay mortar, and at the present time cement is used almost exclusively and the custom of having running water pass through the cellar, has been, to a great extent abolished.

A dry site is selected for the new farm house, cement and concrete are used for the foundation, with the view of having the cellar as dry and clean as any other part of the house. Where the old farm house has undergone repairs and remodeling, the old board floors in the cellars have been removed and replaced with concrete, the walls plastered with cement, making them absolutely vermin and water proof, and in place of the old wooden trough there is a small one built of cement.

All over the rural districts, springs are being walled in with cement, and all precautions taken to keep surface, or "wild water"—as it is often called—out of them. The spring-house or milk-house is built in the same careful manner. The stone walls in old dug wells are being replaced with tiling, concreted on the outside from solid rock to the surface. The drill is taking the place of the pick and shovel for making new wells, which are cased from surface to solid rock. Cities and towns no longer can boast of their more convenient water supply in their houses. The farmer being his own self appointed engineer looks over his grounds, and if there is a never-failing spring on the hillside, elevated higher than the house, the water is piped to the house and barn; or if such a supply does not exist, water is forced into the house by windmill, or gasoline engine, or even by hand power and hot and cold water, with the bathrooms and lavatories are installed all through the house.

By the humble agriculturist of the past these conveniences were considered luxuries, only to be enjoyed by city and town folk, and the wealthy farmer, who either had more money than he knew what to do with, or wanted to imitate the city ways. These things are no longer considered luxuries, but necessities, and we find them in the rural districts all over the State.

One of the first principals of perfect sanitation is to "clean out, clean up and keep clean." But we can't do these things without plenty of water, pure clean water, for both man and beast; and where this is not naturally supplied, the drill will reach it.

The Commissioner of Health has started in at the very fountain head of our water supply, and removed all sources of contamination of the waters, over a great part of the State, and the work will be continued until the surroundings of every farm building are inspected, and everything unsanitary corrected. With very few exceptions the farmer is ready to obey any of the instructions from the health officer. Since it has been demonstrated to be a fact, that, cows drinking water infected with typhoid fever germs, may convey these gems to persons using their milk and this fact has become known throughout the rural districts, when the farmer hears of a case of typhoid fever at the headwaters of a stream from which his cows drink, he is as much interested in the place, where contamination of the waters might occur, as though it were on his own farm.

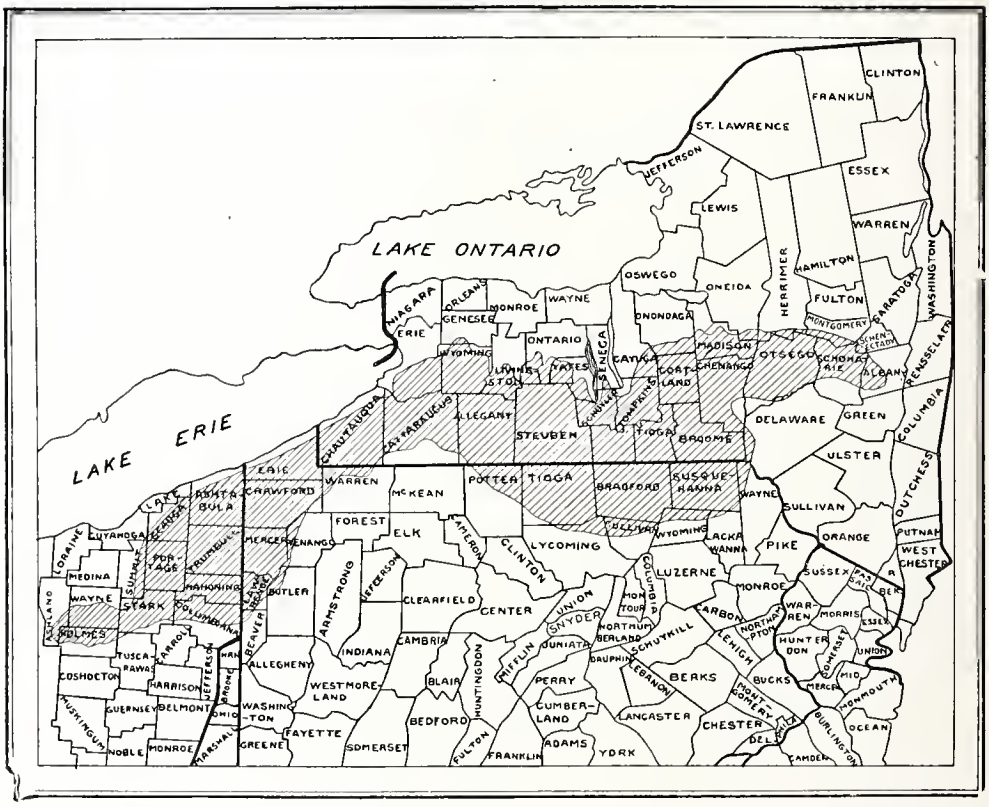

Fig. 1.—Sketch map showing the region occupied by Volusia Soils in Ohio, Pennsylvania, and New York. (By permission of U. S. Dept. of Agri., Bureau of Soils, Bulletin No. 60.)

The printed instructions, issued by the Commissioner of Health, and put in every house where a contagious or infectious disease occurs, has not only been a great aid to physicians, but is educating the layman to his part in the elimination and prevention of disease, not only in his own household, but also, that of his neighbor.

There is much to consider in regard to the dust and smoke nuisance. We of the southwestern part of the State can no longer boast of the pure ozone laden air in the hills and mountains, the air being laden with the smoke and dust from smoke stacks and coke ovens. In my own section, with two ranges of mountains intervening, everything outdoors is blackened more or less. We do not even have white snow. This condition exists over hundreds of square miles of territory. It is easily explained why the water from the melting snow tastes like carbolic acid.

The dust from the public roads is another nuisance which should be abated. This dust has always been a menace, in seasons of long drouth, to farmers living along public highways, and since the introduction of the automobile it has been multiplied many times. A fair sized automobile can, and does, "kick up" more dust than a "20-mule borax team" or a drove of sheep.

It has been a query to me, why people who are apparently thoughtful in everything else pertaining to sanitation and hygiene, will tour over the country roads for days and weeks, in the dry season of the year, inhaling a dust which in itself is unwholesome, and may contain disease germs from both man and beast. The remedy is dustless roads, and it is gratifying to note that they are being made so, by the application of mineral oils, in many parts of the country, notably in the far West.

The vacuum house-sweeper, a modern invention, which, considered from a sanitary point of view, will be a great help in cleaning the house of dirt and dust, when it can be put on the market at a price low enough to enable it, to find its way into every home.

One of the most unsanitary things we have to contend with is the common house fly. It has been demonstrated beyond dispute that the house fly has carried the germs of diseases from one person to others, and from house to house. Gulliver in his travels, when he arrived in the land of the giants, and found the house fly there, as large as a meadow-lark, was probably the first man to discover what a filthy and obnoxious insect it is. In years gone by, the house fly was considered a scavenger, and essential to sanitation. We remember the time, half a century ago, when farmers wives dried most of their fruit by cutting it in quarters, (schnitz) then putting them on strings and hanging them above the stove to dry. These strings of fruit were veritable fly roosts. This dried fruit was exchanged at the country store for city goods. It was then shipped to the cities where it was consumed. There is probably where we made our escape. We were saved by some one else eating the fruit. At meal time we gently lifted the fly out of the jelly or syrup dish, and watched it wiping its feet fore and aft. When it dropped in the hot coffee it was fished out and we went on with the meal, unconcerned about the pesky fly. But even then, and we might say from time immemorial, the house fly which seemed harmless, may have been one of the prime factors in causing epidemics of many diseases, such as cholera, dysentery and typhoid fever.

The fly is said to be short lived. But who ever saw the dead body of a fly that died a natural death. I am sure I never did. The natural breeding place of the house fly is in and about the horse stable. And here is where the eggs and larva can be destroyed by the application of any of the coal tar and creosote disinfectants on the market. These applications must be made about every third day and kept up during the entire summer.

The CHAIRMAN: We now come to the discussion of the reports presented. Is there any discussion or any questions to be asked?

The next paper is the "Improvement of Meadows and Pastures," by Dr. Thomas F. Hunt, of State College.

Dr. Hunt's paper is as follows:

IMPROVEMENTS OF MEADOWS AND PASTURES.

By DR. THOMAS F. HUNT, *State College, Pa.*

The Flemish had a proverb: No grass, no cattle; no cattle, no manure; no manure, no crops.

What these lowland farmers of Europe meant was that good grass is the basis of good agriculture. We are not without illustration in this country, as, for example, the famous blue grass region of Kentucky. Every practical farmer knows that if he has a good, heavy sod to plow up he may reasonably expect, other things being equal, to secure a good crop of corn, while if his meadow is allowed to run out the chance of a successful crop is very much lessened.

It has been the custom to apply yard manure to land for corn and to use commercial fertilizers for wheat, but the value of the fertilizers, particularly commercial fertilizers, in increasing the growth of grass and thereby building up the fertility of the soil has not been generally understood. It is true that some farmers do top dress their meadows with yard manure and this is a good practice but very few have applied commercial fertilizers to their grass lands. After some years of investigation of this subject I believe it safe to assert that the same money used in applying commercial fertilizers to grass lands will bring a greater profit when applied for corn or wheat. Of more importance, however, is the fact that while obtaining this greater profit the land is made more productive for succeeding crops. This does not mean that fertilizers may not be used to advantage for either corn or wheat, but merely that a still greater profit results when applied to grass lands.

This paper has only one purpose. It is to demonstrate so clearly and forcibly that the above statements are true that land owners will be induced to act upon them.

In the address on "Soil Fertility" delivered before the last meeting of the Pennsylvania State Board of Agriculture, the speaker touched briefly upon the importance of clover in keeping up the fertility of the soil. It is desired to develop a little more in detail the lesson

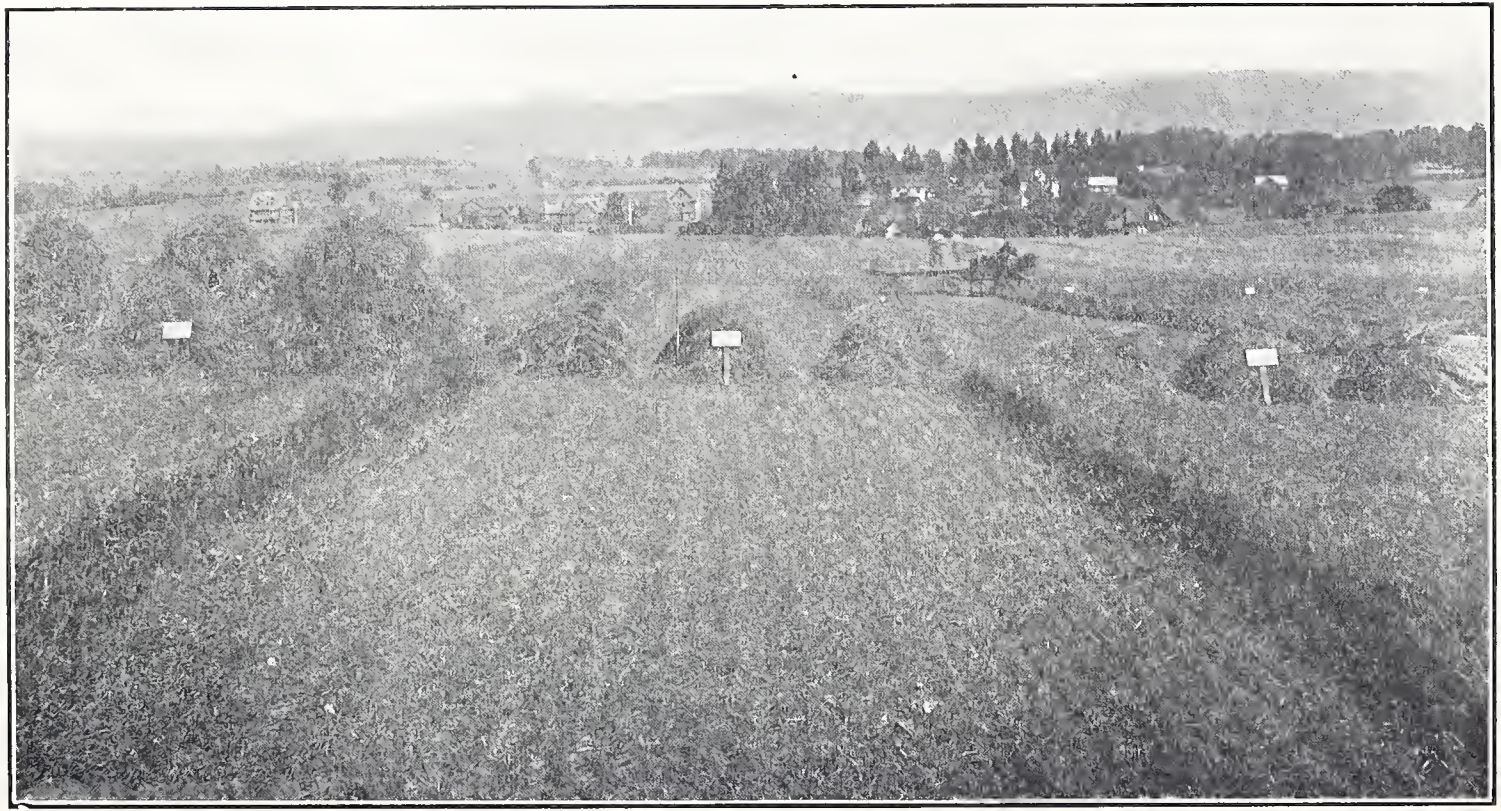

Fig. 2.—Plats 13, 14 and 15.

of these fertilizer experiments at the Pennsylvania Station with reference to the influence of common red clover. Those who listened to the address of last year or who have read the bulletins of the Pennsylvania Station know that these fertilizer experiments which have been in progress twenty-eight years consist of four tiers, each containing thirty-six eighth acre plats. The four tiers represent a complete four year rotation of corn, oats, wheat and hay (clover and timothy). The fertilizers are applied to the corn and wheat only thus being applied on alternate years or twice in the rotation.

It so happens that there are five plats on each tier receiving no fertfertilizers of any sort while there are four which have received only mineral fertilizers consisting of 48 pounds of phosphoric acid, equivalent to 320 pounds of 15 per cent. dissolved bone black or dissolved rock phosphate and 100 pounds of potash equivalent to 200 pounds of muriate of potash, 80 per cent. purity. The following table shows the average yield of the seven products of the rotation during the last five years of the first twenty-five years, where there was no fertilizer and where mineral fertilizers were applied. These years have been chosen because the conditions probably more nearly represent the comparative results to be obtained on run down limestone soil:

AVERAGE FIVE YEARS, 1902-6.

	No treatment. 5 plats.	Phosphoric acid 48. Potash 100. 4 plats.
Corn, ears, bu.,	35.6	51.4
Corn, stover, lb.,	1,711	2,685
Oats, grain, bu.,	23.4	34.4
Oats, straw, lb.,	1,110	1,693
Wheat, grain, bu.,	10.5	19.9
Wheat, straw, lb.,	816	1,627
Hay, lb.,	2,329	4,469

During the last five years, 1902-1906, in place of 36 bushels of corn where no fertilizer was applied, 51 bushels were grown where mineral fertilizers only were used. There were 34 bushels of oats in place of 23 bushels, 20 bushels of wheat in place of $10\frac{1}{2}$, and nearly $2\frac{1}{4}$ tons of hay in place of a little more than a ton. This was done at an annual cost of $3.20 per year; but if we are correct in believing that the application of potash was excessive and could be reduced one-half, then the result would be obtained at an annual cost for fertilizer of $2.20.

This photograph shows the hay raised this year (1909) on plats 13, 14 and 15 of tier 3. Below is shown the treatment, as follows:

	Treatment.	Yield.
Plat 13	Plaster, 320lb.,	1,408
Plat 14	No treatment,	1,216
Plat 15	P 48, K 100,	4,496

Plat 14 has received no fertilizer in twenty-eight years, while plat 15 has received the mineral fertilizers every other year. The first plat yielded at the rate of a little over half a ton of hay, while the latter produced at the rate of nearly 2¼ tons. It will also be observed that but little result was obtained from the application of 320 pounds of land plaster. The principal reason for introducing this photograph, however, is merely to impress my hearers with the fact that these were actual results obtained from real land.

The purpose of calling attention sharply to the results obtained from the use of these mineral fertilizers, phosphoric acid and potash, is not for the purpose of pointing out their value in keeping up the fertility of the soil so much as it is to call attention to the vast importance of clover and other leguminous crops in supplying the nitrogen. Nitrogen is absolutely necessary to growing crops. It usually is the first element to be exhausted from the soil. It is the most expensive element to replace, costing about 20 cents a pound as compared to five cents for phosphoric acid and four cents for potash.

The three principal methods for keeping up the nitrogen supply of the soil open to the average farmer are (1) by raising clover or other leguminous crops, (2) by carefully saving through the use of proper bedding the liquid excrement of animals, since it is the liquid excrement that contains most of the nitrogen, and (3) by buying nitrogen in commercial fertilizers at twenty cents a pound for the nitrogen contained. All three ways are good in their place. It is safe to say, however, that the farmer who raises staple farm crops and does not have a systematic rotation in which clover or some other leguminous crop enters is slowly going into bankruptcy.

But, it may be said, I cannot raise clover any more. It must be admitted that there is a vast area, more than ten million acres in New York, Pennsylvania and Ohio known as the Volusia series of soils on which in recent years great difficulty has been found in raising red clover. The distribution of this series of soils is shown roughly on this map. It so happens that the speaker lived for some years on the edge of this area and studied the soil conditions with considerable care. Some experiments were planned and carried out by Cornell Station in order to determine, if possible, why clover failed so completely on certain of these soil types, especially that type known as the Volusia silt loam.

A careful study of all the probable factors influencing the growth of red clover was made. Among other things experiments were made to determine the influence of lime, yard manure and commercial fertilizers in producing red clover. One of these trials was conducted on a loam soil at Cherry Creek, Chautauqua county, New York, described as a once fertile farm that had become so poor that the former owner had lost it. The following table shows the method of treatment and the results obtained during 1908. The mammoth clover was sown in oats the previous year. To avoid misunderstanding, it should be stated that other results, not given here, indicated that common red clover was to be preferred to mammoth clover.

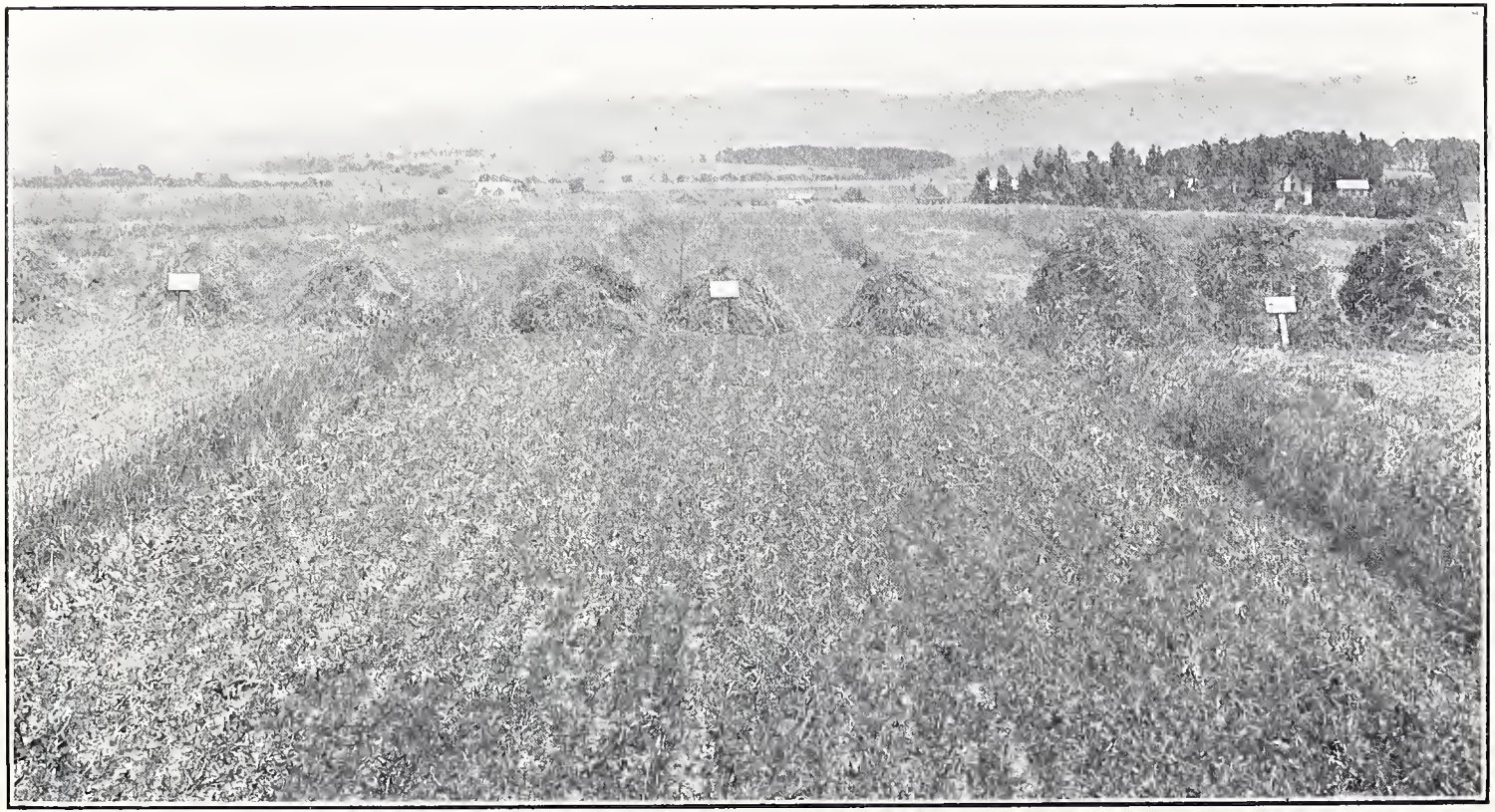

Fig. 3.—Plats 22, 23 and 24.

YIELD OF MAMMOTH CLOVER IN 1908 AT CHERRY CREEK, CHAUTAUQUA COUNTY, NEW YORK.

No. Plats.	Treatment.	Unlimed.	Limed.
5	Nothing,	1,824	3,852
1	P, K,	2,349	4,174
1	P, K, N,	2,235	4,085
1	15 tons manure,	2,091	4,976

P = Acid phosphate, 100.
K = Muriate of potash, 50.
N = Nitrate of soda, 100.

Here the most important result was obtained by liming and here the best results were obtained by both manure and lime. Where there was a combination of manure and lime 2½ tons of hay were obtained in place of a ton without treatment. Not only was the yield of hay increased but the character was changed. Although only mammoth clover was sown, on the unlimed plats the principal grass growing with the clover was redtop, while on the limed plats the redtop was replaced in part by timothy which made a strong growth.

In another experiment made in Tomkins county where the soil type, Volusia silt loam, was much less productive, yard manure gave much less favorable results. The unlimed and unfertilized area yielded 1,015 pounds of hay; the limed area without fertilizers, 1,612 pounds of hay; the limed area which received mineral fertilizers yielded 1,929 pounds of hay; while the limed area which received yard manure yielded only 1,555 pounds of hay. In other words, the stable manure caused an apparent decrease in yield. This second experiment, however, in no way detracts from the lesson to be derived from the Chautauqua county experiment. It merely shows that other conditions exist to prevent the manure becoming effective. In this particular instance it was probably due to the manure emphasizing the effect of the severe drouth.

Any land which, when sown to clover and timothy, produces in their stead chiefly redtop and sorrel (Rumex acetoselo), will be benefited by the use of lime. Apply anywhere from 1,000 to 4,000 pounds or from 15 to 50 bushels. In the opinion of the speaker it does not matter greatly how much is applied, when it is applied, or what kind is applied. The chief thing is to get finely divided lime into the soil. Ordinarily it may be applied on top of plowed land when it is being prepared for corn. One may buy recently burned quick lime and allow it to slake in piles, or buy slaked or hydrated lime or ground or pulverized limestone provided it is ground finely enough. It should be remembered, however, that it takes about 1,350 pounds of hydrated lime and about 1,800 pounds of pulverized limestone to furnish as much actual lime as 1,000 pounds of pure quick lime.

There is one lesson, however, that every land owner should not forget, namely, that while lime with manure will increase the yield the continued use of lime without manure may decrease it. Lime cannot take the place of fertilizers nor can fertilizers take the place of lime. Here is a photograph of three plats showing the yield of timothy and clover from tier 3 of our fertilizer series.

No. plat.	Treatment.	Yield of hay, 1909. Lb.	Yield all products, 1882-1906.
22	Manure, 6 tons,	5,784	18,016
	Lime, 2 tons,		
23	Lime, 2 tons,	1,880	11,632
24	No treatment,	1,040	11,663
16	Manure, 6 tons,	4,008	17,383

Plat 22 has had six tons of manure once in two years and two tons of quick lime once in four years.

Plat 23 has received the lime the same as plat 22, but has not been manured, while plat 24 has had nothing done to it during the past twenty-eight years. Another plat (plat 16) not shown in this picture has received the same amount of manure as plat 23 but has not received any lime.

Having demonstrated the importance of clover or other legume in maintaining the supply of nitrogen and having emphasized the importance of lime where needed in maintaining a good stand of clover, the next step is to demonstrate the importance of commercial fertilizers in maintaining meadows. In 1903 the Cornell Station began the study of timothy from a great variety of standpoints. Among the experiments started was one to determine the influence of fertilizers in increasing the yield of pure timothy hay. A piece of well worn but not exceedingly fertile land known as Dunkirk clay was used. It was the intention to seed the timothy in 1903 with wheat. The land was prepared and fertilized that fall but rains set in and prevented sowing the wheat. Oats and timothy were, therefore, sown in the spring of 1904. The chart shows the actual average yield per acre of timothy hay obtained from the different plats during 1905, 1906 and 1907.

AVERAGE ACTUAL YIELD OF TIMOTHY HAY PER ACRE DURING 1905, 1906 AND 1907.

No. of Plats.	Treatment.	Weight, Lbs.
8	Nothing,	2,901
1	P,	4,233
1	K,	4,490
1	N,	4,530
1	P, N,	4,797
1	P, K,	4,127
1	K, N,	5,127
6	K, N. P,	6,615
1	10 tons manure,	5,093
1	20 tons manure,	7,293

Commercial fertilizers were applied in the fall of 1903 as previously stated and directly to the timothy in the spring of 1905, 1906 and 1907, just as the grass was starting. Stable manure, however, was applied only in the fall of 1903 and in the fall of 1906. In the latter case, of course, as a top dressing. The average of eight nothing plats during three years shows a yield of timothy hay of about $1\frac{1}{2}$ tons. The yield obtained from plats treated with commercial fertilizers varied from two to over three tons per acre, while the plats receiving yard manure varied from $2\frac{1}{2}$ to $3\frac{1}{2}$ tons. In order to show the effect of the fertilizers more distinctly this chart has been prepared.

TIMOTHY HAY ON DUNKIRK CLAY AT CORNELL UNIVERSITY, AVERAGE RESULTS 1905, 1906, 1907.

	Apparent increase in yield, lb.	Net annual gain due to fertilizers 4 years.
N,	1,211	$1 71
P,	682	1 13
K,	988	2 03
N, P,	1,614	1 91
N, K,	2,082	4 55
P, K,	1,079	1 85
N, P, K,	2,632	5 46
10 tons manure,	2,975	9 37
20 tons manure,	5,175	14 60

N = 160, nitrate of soda.
P = 320, acid phosphate.
K = 80, muriate of potash.

Note that N stands for 160 pounds of nitrate of soda equal to 25 pounds of nitrogen, P for 320 pounds of acid phosphate equal to 50 pounds of phosphoric acid, and K for 80 pounds of muriate of potash equal to 40 pounds of potash. The manure has been estimated in this table at one dollar a ton or load. The first column shows the apparent increase in yield due to the treatment, that is to say, it shows how much greater than yield was then on adjacent unfertilized plats.

The yield of oats in the year 1904 is not shown in this chart. While the fertilizers caused an increase in the yield of oats, the increase was not sufficient to pay for the fertilizers. In preparing the second column, therefore, in order not to over estimate the value of the fertilizers the loss from the use of them when applied to the oats has been subtracted. It is evident from this table that nitrogen was the most important element in increasing the growth of timothy on the soil in question, and that next to that potash caused the greatest gain in weight. However, as is usually the case a complete fertilizer gave a larger yield than any two elements. Counting yard manure worth one dollar a ton the great value of stable manure is shown in producing timothy. The value of the manure may be stated in another form. Neglecting entirely the increased yield of oats due to the application of manure and estimating timothy hay at $10

a ton the manure was worth $2.18 a ton or load when ten tons were applied and $1.94 when twenty tons were applied. As the experiment progresses the smaller application of manure becomes relatively more valuable per ton of manure applied. In general terms a ton or load of manure produced about two dollars worth of hay when the latter is worth $10 per ton.

This experiment emphasizes the readiness with which timothy responds to fertilizers of any kind in this humid climate. Almost any good tillable land in Pennsylvania can be made to yield from two to three tons of hay per acre in an ordinary season. In 1908 the Pennsylvania Experiment Station weighed twenty-four tons of well cured hay from 5 2-3 acres. The previous year certain portions of this same area yielded at the rate of 5 tons and 189 pounds of hay per acre, although the weight of the whole field was not determined in that year. In 1908 the Experiment Station had two fields in timothy and clover. From one field of nine acres 42 loads of hay were obtained, from another field of exactly the same soil type eight loads of hay were obtained from twenty acres. The first had been well farmed, the second had not.

The whole story of the timothy meadow experiment has not been told. The most important part of the story is yet to follow. The purpose of this experiment was not primarily to determine the direct value of commercial fertilizers in increasing the yield of timothy hay but to determine whether the fundamental principle underlying the old Flemish proverb was sound, namely, that good grass was essential to a good agriculture.

After these plats were in timothy for three years they were plowed up and planted to corn without the addition of any fertilizer whatever in order to determine the residual effect of the fertilizers on the subsequent crop. These results have not yet been published, but Professor J. A. Bizzell of the Cornell Experiment Station has furnished me the detailed results in which it is shown that the eight plats which during the previous years had received no fertilizer gave an average yield of 30.4 bushels of corn per acre, while the six plats which had received a complete fertilizer gave an average yield of 56.8 bushels or a gain of 26.4 bushels, while the two plats which twice in the previous four years had had two applications of stable manure gave an average yield of 67½ bushels, or a gain of 37.1 bushels per acre. A handsome profit had already been made from the use of commercial fertilizer and the stable manure. The gains, therefore, represent almost clear profit since the only additional cost was that of harvesting the increased yield. This is taking no account of the increased yield of stover which was nearly, although not quite, as marked as that of the grain.

Even to the hardened investigator these results come almost as a revelation. It is all so simple. All that was done was to apply broadcast by hand at the right time from one-tenth to one-fifth of an ounce per square foot a commercial fertilizer containing the proper proportion of nitrogen, phosphoric acid and potash. If, however, the results which have been given are to be duplicated the greatest care must be taken to have the conditions and methods correct. To obtain the best results, three things are essential: (1) there must be a proper stand of grass, (2) the fertilizers must be applied at the right time, (3) the fertilizer must be of the proper character.

One reason why good results are obtained by the use of commercial fertilizers on grass land is due to the fact that there are so many plants to the acre and that the soil is so full of plant roots ready to make the fullest use of fertilizers applied. It is highly important also that the plants growing upon the land shall be the right kinds. Not only will the wrong plants or weeds reduce the quality of the hay but they usually reduce the yield because generally they will not produce the same weight as would the timothy or clover which they displace. Where, therefore, the meadows have run out and a poor stand of grass remains, the land should be plowed, limed if needed, and put into a systematic rotation. There will then be a stand of grass that it pays to maintain by the use of commercial fertilizers. As an illustration a trial made at the Pennsylvania Station during 1909 may be mentioned.

The Pennsylvania State College has recently added a run down farm of 200 acres to its holdings. A certain twenty acre field which was in wheat when purchased was this year in grass, mostly timothy. The land was too poor to obtain a good catch of clover, although an abundance of seed was sown. Even the timothy was a poor stand. From 11.7 acres of this plat six loads of hay were obtained. These loads were not weighed but if we estimate them at 1,700 pounds each 875 pounds of hay per acre is obtained. On the remaining 8½ acres on April 5, 1909, just as the grass began to grow, commercial fertilizers were applied at the following rate per acre: Acid phosphate 150 pounds, muriate of potash 50 pounds, sodium nitrate 150 pounds. From this 8½ acres eleven loads of hay were obtained while from the 11.7 acres unfertilized but six loads were obtained. If the loads are again estimated at 1,700 pounds per acre the yield in place of being 875 pounds per acre was 2,200 pounds per acre. The cost of the fertilizer not including the cost of application was $5.57 per acre or about $8.40 per ton of hay. While this is a fairly satisfactory result it is not what it should have been because of the poor stand of grass.

The second important consideration is the time of application of the fertilizer. It is very important that the commercial fertilizer should be applied just when the grass begins to start in the spring. The station is of the opinion that a delay of even a week at this time may seriously interfere with the effectiveness of the fertilizer. In order to get the best yield of hay, it is essential to get a good, strong growth during the cool, moist portion of the season. It is during this time that we have the least productive soluble nitrates in the soil and hence doubtless the nitrate of soda supplies the necessary nitrogen in the right form for the plants.

Third, in order to get the best results with commercial fertilizers on grass lands, it is necessary to apply a commercial fertilizer containing the right proportion of nitrogen, phosphoric acid and potash. No absolute rule can be laid down for all lands and conditions, but for average conditions the application to grass lands of 25 pounds each of nitrogen, phosphoric acid and potash is recommended. This may be obtained by applying 350 pounds of a 7-7-7 mixed fertilizer or by applying a mixture composed of 150 pounds of nitrate of soda, 150 pounds of acid phosphate and 50 pounds of muriate of potash. It will be noticed that the ordinary mixed fertilizer commonly used for wheat and corn is relatively too high in phosphoric acid and too low in nitrogen.

There is time for only a word about pastures. While quantitative results have not been obtained, it has been abundantly shown that pastures may be improved by the application of either natural or commercial fertilizers. Where pastures are heavily grazed and the animals fed little or no other food, usually they gradually decline. If, however, the cattle are fed considerable concentrated food, especially of a highly nitrogenous character, or if the pastures are top dressed with manure or commercial fertilizers they may steadily grow better. An occasional application of seed, the clipping of the weeds and the harrowing of the fields will also contribute to this end.

The one lesson above all others that the Pennsylvania Station desires to teach, is that soil cannot be made fertile economically at a single stroke, and that land can only be kept up to its highest productive capacity by a carefully and wisely ordered system of cropping, cultivation and fertilization.

In the address made a year ago the speaker suggested as a means to that end a five course rotation that might meet the needs of many farmers. The rotation recommended was corn, oats, wheat, each one year, and timothy and clover two years. On a limestone soil the following fertilization was suggested: For corn, six tons of manure per acre; for oats, no fertilizers except when beginning to build up the soil, in which case 150 pounds of acid phosphate was recommended. For the wheat apply 350 pounds of acid phosphate and 100 pounds of muriate of potash. No fertilizer was recommended for the first crop of hay, for the second crop an application of six tons of yard manure applied the previous summer or fall and if yard manure is not available the application in the spring just as the grass begins to start of commercial fertilizer just recommended for grass lands.

Another rotation is here suggested, not because it is any better than the one previously recommended, but merely to show the possibilities of building up the soil through the application of commercial fertilizers to grass lands.

A SEVEN COURSE ROTATION; MERELY A SUGGESTION.

Year.	Crop.	Fertilizer.	Amount.
1	Corn,	Yard manure,	6 tons.
2	Corn,	Yard manure,	6 tons.
3	Oats,	Nothing.	
4	Wheat,	Acid phosphate,	350 pounds.
		Muriate of potash,	100 pounds.
5	Clover and timothy,	Nothing.	
6	Timothy,	Nitrate of soda,	150 pounds.
		Acid phosphate,	150 pounds.
		Muriate of potash,	50 pounds.
7	Timothy,	Nitrate of soda,	150 pounds.
		Acid phosphate,	150 pounds.
		Muriate of potash,	50 pounds.

Modifications of this rotation will occur to every practical farmer. The purpose here is to indicate the application of our present knowledge of the means of maintaining soil fertility to actual farming conditions and to emphasize the importance of some system if the best results are obtainable.

The CHAIRMAN: Any questions?

MR. CREASY: I would like to ask about putting on the manure, when it was done?

DR. HUNT: The manure would be put on in the preceding summer and fall; the commercial fertilizer just when the grass starts in the spring.

PROF. MENGES: What was the effect of the lime; simply a neutralizer of acids or what other effects?

DR. HUNT: The fact is we do not know much about the chemical and physical effects of lime on the soil. We know we get crop results. Whenever we sow timothy and clover and in place of getting timothy and clover we get redtop and sorrel, then the land needs liming.

A Member: I saw a field on the lower college farm where commercial fertilizer was used. Did you keep an account of how much hay you got off that?

DR. HUNT: Yes, sir; you will find the figures in the printed address.

A Member: What time did you sow your clover?

DR. HUNT: Up at State College we sow rather late. That is to say, in April. Practice differs in different sections. In the Central West the tendency is to sow as soon as the frost is out of the ground, after a sharp freeze the clover is sown. Then as the ice melts the clover seed sinks in the liquid mud and is covered. But we think in the East the consensus of opinion is that we get better results by waiting until the weather is well settled.

MR. RODGERS: May I ask the gentleman, how did you put the manure and lime on the land?

DR. HUNT: We first manure and plow, and then spread the lime on top of the plowed land.

A Member: For corn?

DR. HUNT: Yes, sir.

A Member: You use granulated limestone?

DR. HUNT: We do all kinds of things at State College. Generally, however, we buy a carload of burned lime, take it out in the field, place it in a long pile and let it stand for awhile. The more or less slaked lime is then spread at the rate of fifty bushels of lime to the acre with a manure spreader. That is nearly two tons of lime to the acre. We use the rather large amount because we can buy lime cheap and labor is dear.

The SECRETARY: What would be the effect, Doctor, if you were to spread the manure and then spread the lime on the manure?

DR. HUNT: I think it would be undesirable. To illustrate that lime question further: We can also buy very finely ground raw limestone cheaply, because it is a by-product. We happen to have a lime spreader and I think this year we shall apply the raw ground limestone to 16 acres.

A Member: How does it come to you?

DR. HUNT: They send it to us in this case in bags which we return.

A Member: Paper bags?

DR. HUNT: Cloth bags.

A Member: Would you tell us what would be a fair price to pay for the ground limestone?

DR. HUNT: About one-half as much as for quick lime when delivered on farms. We get quick lime at less than $3.00 per ton and I think we pay $1.15 for the ground limestone f. o. b. cars at quarries. We are near the limestone quarries.

A Member: It don't pay to pay $8.00 per ton for raw ground limestone?

DR. HUNT: No, sir.

A Member: It is sold for that in some parts of the State.

DR. HUNT: It only takes about one-half as much quick lime.

MR. HERR: Is that limestone finely pulverized?

DR. HUNT: Yes, sir.

MR. HERR: If it were possible to obtain that by-product and they were compelled to go into the business of grinding that limestone, could you get it at $2.00 per ton?

DR. HUNT: I am told that some thoroughly equipped factories are able to do so, but as a rule you probably would not be able to grind it fine enough at the price named.

The SECRETARY: I would like to ask Dr. Hunt whether it would be possible for us to get the charts and photographs to put with the printed report of that address?

DR. HUNT: It is all here in printed form, excepting the photographs which I can furnish.

A Member: How fine should that limestone be ground?

DR. HUNT: It is desirable to have raw limestone go through a screen with 80 meshes to the inch.

MR. STOUT: I notice up at the College you have a lime kiln at the quarry back of the farm. You spoke of getting the lime from Bellefonte. Why don't you use the lime from your own quarry and kiln?

DR. HUNT: We believe it is cheaper for us to buy the burned lime at the prices named and to use the stone to build roads. We would have to handle nearly two tons of stone to get one ton of burned lime and we have to ship in the coal to burn it.

MR. R. I. YOUNG: Did you ever put on 200 bushels of lime to the acre?

DR. HUNT: No, sir. It would seem to be excessive.

MR. YOUNG: If you would come to Middletown you would see where 200 bushels of lime to the acre were put on.

DR. HUNT: The question is whether you would not have gotten practically the same results if you had put on 50 bushels.

MR. YOUNG: It was bottom land, swamp land. 50 bushels would have been like a drop in the bucket.

The CHAIRMAN: The next paper is the "Past, Present and Future of Agriculture," by N. F. Bartley, of Euclid, Pa.

Mr. Bartley then read the following paper:

PAST, PRESENT AND FUTURE OF AGRICULTURE.

By N. F. BARTLEY, *Euclid, Pa.*

Mr. Chairman, Ladies and Gentlemen: I sincerely wish that one of greater ability had been selected for the duty imposed upon me, for I feel that, while cheerfully responding to the duty, I know that I can but feebly express my thoughts. I came here to learn—I came here as a student, and I do not feel that I have the power to advance ideas in comparison with those who have been on the platform for years. But we find in the good book, "Let every one be subject to the powers that be;" and since the powers that be have asked me to come before you and advance some ideas upon some agricultural subject, but did not assign any one in particular, I, therefore, have chosen a topic that will give me plenty of latitude.

Past, Present and Future of Agriculture—When God created the earth it was a scene of picturesque beauty, unbroken forests crowned the hills and valleys and Nature undisturbed for ages had wrought upon, and beneath the surface in preparation for the time when the hand of industry should cause the one to bloom as a garden and the other to give up its stores of untold wealth. He looked upon it as a fit habitation for the abode of mankind; but mankind saw that it was not necessary for him to cultivate the soil as there was an abundance of animals and fruits for his sustenance; hence, we have very little account of any of the cereals being raised until the time of the famine in Egypt. The tillage of the soil and raising of grain was only a side issue. But as time rolled on and conditions changed man saw that there was money as well as pleasure in the cultivation of grain—so

that in all lands agriculture has been and will be a profitable employment. But no country has succeeded so well in agriculture as the United States, but we accomplished it at great hardship and expense.

Sturdy men with strong arms and stout hearts felled the forests. Brave women endured the loneliness of the wilderness, met the many perils and dangers of every day life with a heroism deserving of immortal remembrance. And in place of the forests, broad green fields enriched with labor and enriching the husbandman are in the place. Active, bustling villages and cities have effaced all signs of early hardship and suffering, and the old scenes about which we have lingered are no more. So pass our dreams. The infancy of Nature has reached its age; old-fashioned modes of life with their simplicity of manners have passed away with our forests; farm machinery which answered the purpose of its day has been supplanted by that which is more modern and serviceable.

But the question may be asked, How do we account for this advancement in agriculture? and the answer is simply by education. There was a time in the history of agriculture when our forefathers cleared our forests that all they had to do was to "tickle the soil" with a hoe, plant the seed and they were sure of a bountiful harvest. But they had no knowledge of the soil. They seemed to think that they could practice this method of farming without any depletion of the soil, and the result was that the soil was becoming poorer and poorer; and then they began to search for a remedy for its restoration. The remedy came in our Agricultural Colleges and Experiment Stations, followed up later by our Farmers' Institutes and Granges and other kindred organizations.

Farmers of to-day know that in order to make their land produce they must feed it. You can't be taking from all the time and giving nothing in return, for as sure as you do you will come to the end. But then there is a class of people who see no good in anything; always satisfied with the present; never rising above the brute creation. To such people exhortation or advice would be like casting pearls before swine.

It should be the aim of every individual to make this world better by living in it; to make two blades of grass grow where only one grew before; to excel his forefathers; in short, to be the peer of everybody else. Never be satisfied with fairly good, pretty good or good enough. Accept nothing short of your best; your reputation is at stake in everything you do, and your reputation is your capital.

But what about the future of agriculture? What will we have accomplished in the next decade? During the next twenty years we are going to see a great revolution in farming. Agriculture is to be more intelligent and more intense; new plants will be introduced; a better use is to be made of the land, and an acre will produce twice as much as it now produces.

Beneath our feet is the fertile and productive soil. We have beautiful homes with everything needful to make life comfortable and worth living—all within easy reach. The hills, rock-ribbed and ancient as the sun; the vales stretching in pensive quietness between, the venerable woods, rivers that move in majesty, and the complaining brooks that make the meadows green.

The CHAIRMAN: Gentlemen, you have heard the paper. What action will you take in regard to it?

On motion it was received and filed for publication with the proceedings.

The CHAIRMAN (Governor Stuart): I would now like to ask the Board to excuse me. I have some important business upstairs that needs attention. If I can find it possible at all to return I will try to come back.

I will call to the Chair, the member whom you elected just before adjournment this morning, John C. Weller, First Vice President of your association, and turn you over to his tender mercies.

MR. HERR: Mr. Chairman, there are a whole lot of fellows here from the western end of the State and from all over the State, for that matter, who don't often have a chance to greet a live Governor. I would like them to have a chance to greet the Governor before he leaves us. He may not be able to get back again.

First Vice President John C. Weller in the Chair.

ADDRESS OF GOVERNOR STUART.

I will be very glad, Mr. Herr, to meet the members of the Board. These proceedings are very interesting and very instructive. That address of Dr. Hunt was a very practical thing, and I think with that advice a little knowledge of farming, that almost any person could go into the business and make it successful. I have always held that the same energy that the young man puts in business in the city, put on the farm in the country would give better results very often than in the city. Because in the city he meets every competition; there he meets disappointments and very often it is not all the men in business in large cities who become millionaires. It is not all the men who become successful or will have enough after many years in business to retire with a competency. We hear of the successful ones, but never hear of the ones who have struggled just as hard as the successful ones and never been able to acquire a competency. If we could only get and induce the young man to stay and work on the farm, work hard. It is not an easy life; but no success is easy. There are very few men that go to sleep who have success. Success comes first of all by industry. Secondly, by integrity in having people believe in you. And you can do that better on the farm than any other place I know. If we can, we must impress on the young men of this State the benefits to be derived from making an intelligent study of and following the business of agriculture. That has made this State great. We have labors to perform and great services not only to the State but to all the people and it is just such papers as read by Dr. Hunt, who knows and tells us what to do, that will enable us to accomplish what we should. If a man goes to farming, he must understand his business. If he is extravagant and buys this crushed rock at $4.00 per ton when he can buy it at $1.15 he will break up inside of a week just as he will if he does that kind of business in the city.

I would like to stay here with you longer. I enjoyed and appreciate the thoughts expressed in the practical paper of Mr. Bartley. After all, success means work, industry, application to your work. While a

man may be unfortunate or may have some unfortunate condition brought into his life, there is no such thing as luck. It all depends upon work and energy and the integrity of the man. If you have a product you sell for $2.00 to $3.00 per bushel and it is good, the people will buy. If you try to deceive the people you will never succeed.

I did not intend to say anything here but I got enthused.

The CHAIRMAN: A recess of five minutes is declared to give the members an opportunity to shake hands with and greet the Governor.

(RECESS.)

The CHAIRMAN: I desire to thank the Board at this time for the honor conferred in selecting me as one of your Vice Presidents and to ask your co-operation that my duties may be pleasant and profitable.

The SECRETARY: Mr. Chairman, I would like permission at this time to have the roll called again, so that we will be sure to get upon record all who are present. I think that some have come in since the roll was called this morning.

Roll call.

MR. FENSTERMAKER: The Committee on Credentials is ready to make further report.

The SECRETARY: If that Committee is ready to report we might as well hear from them now.

The CHAIRMAN: We are ready to hear the supplemental report of the Committee on Credentials.

SUPPLEMENTAL REPORT OF COMMITTEE ON CREDENTIALS

MR. FENSTERMAKER: In the absence of the Chairman, Mr. Rodgers, I present the credentials of Mr. Samuel Bream, representing the Adams County Agricultural Association. We find the credentials regular and recommend his admission as a delegate.

After having heard W. Theo. Wittman and the Hon. A. J. Kahler in regard to the representation of the Pennsylvania Branch of the American Poultry Association, and this being the only active organization of its kind in the State at present, and realizing the importance of the poultry industry, we recommend the admission of W. Theo. Wittman as a member of the State Board of Agriculture.

MATTHEW RODGERS, Chairman.
P. S. FENSTERMAKER.
J. F. SEAVY.
E. R. WARBURTON.
D. S. TAYLOR.

The CHAIRMAN: What is the pleasure of the Board in regard to the report?

The SECRETARY: I move the adoption of the first item of the report.

The motion was seconded, put and carried.

The SECRETARY: Of course, this motion is intended to include that the name of this gentlemna be entered upon the roster as a member of the Board.

A Member: Mr. Chairman, I move the adoption of the second item of the committee's report.

The motion was seconded, put and carried.

MR. KNUPPENBURG: Mr. Chairman, I would like to withdraw my name from the Committee on Resolutions as I will be unable to attend to the matter.

The CHAIRMAN: Are there any objections? If not, he has that privilege and I will appoint in his place Mr. McGowan, of Berks county.

The CHAIRMAN: We are now ready to hear the report of the Pomologist, Mr. Gabriel Hiester, of Harrisburg, Pa. Is Mr. Hiester present?

Mr. Hiester was present and read the following report:

REPORT OF POMOLOGIST.

By GABRIEL HIESTER, *Harrisburg, Pa.*

Pomology correctly defined is "The science of growing fruit." I therefore conclude that the report of the Pomologist should deal with the advance that has been made during the past year in the science of growing fruit, and I shall confine myself to that subject.

ORCHARD MANAGEMENT.

Our State Experiment Station has for two years been conducting a line of experiments in eleven different orchards in widely different parts of the State which have been loaned by their owners for the purpose, to ascertain what effect the different substances used as fertilizers, namely, nitrogen, phosphoric acid and potash, have, first, on the growth of the tree; second, on productivity; third, on color and quality of the fruit. Professor J. P. Stewart has had charge of these experiments. In the same orchard, on a different set of trees, he is running a series of cultural experiments to ascertain the effect of clean culture, culture with cover crops, sod and sod-mulch. A bulletin has been prepared and will soon be published showing the results of these two years' careful work along these lines, and although the experiments have run too short a time to enable us to draw positive conclusions, they seem to indicate what our practice should be, and it is very gratifying to know that we are advancing somewhat in our knowledge of proper orchard management.

INSECTICIDES AND FUNGICIDES.

For some years Bordeaux mixture has been considered the only reliable fungicide, but lately our orchardists have suffered considerably from what is known as Bordeaux russeting of fruit and Bordeaux injury to foliage. Our experimenters have been looking for a substitute which should possess as great fungicidal properties and at the same time prove harmless to fruit and foliage.

During the past year Professor Stewart, of our State Experiment Station force, has been studying very carefully the preparation of a concentrated lime-sulphur solution, its properties and uses, with special reference to its use as a summer spray. He has succeeded in making a concentrated solution, that can be held a long time without crystallizing, and can be diluted to the proper degree and applied cold at any time, thus doing away with the disagreeable work of boiling at the time of application and applying hot. He has also by a number of tests made by applying different strengths to all kinds of tender foliage in all kinds of weather determined with considerable accuracy what degree of dilution is necessary for the different kinds of fruit trees. A bulletin has been issued (State College Bulletin No. 92) giving in detail the method of preparation, and the apparatus needed, which is so simple that any grower of ordinary intelligence can make it. The bulletin also gives methods of testing its strength and the proper degree of dilution at which to apply it. While the results obtained in one season are not sufficient to definitely determine the exact value of the solutions recommended, not only our own experiment station but those of other states believe it is very valuable, and during the coming summer these sprays will be thoroughly tested by the various experiment stations and by a large number of commercial fruit growers in orchards all over the United States.

Our Economic Zoologist, Professor Surface, has given them a very thorough test in his demonstration work during the past season and expresses himself as much pleased with the results, which he has published in his December Bulletin. Professor Waite, of the United States Department of Agriculture has been experimenting with combinations of iron and sulphur, and while he is not yet ready to report results, he thinks he has found a compound that is absolutely harmless to both fruit and foliage yet is sure death to the spores of fungi. When we take into account the careful work that has been done and the satisfactory results that have been obtained in these first trials, I think we may safely say we have made a decided advance along these lines.

EFFECT OF SOIL AND SUBSOIL UPON DIFFERENT VARIETIES.

The effect of subsoil on varieties of fruit and also the effect of the same subsoil at different altitudes has long been recognized by some pomologists and by many practical fruit growers, but up to this time we have never succeeded in interesting either the National or State Department of Agriculture sufficiently to have a soil survey of the State made, for the purpose of determining the best location for the different varieties now under cultivation. I am informed by Dr. Hunt, Director of our Experiment Station, that he has great hopes that such a survey will be started before the close of this year.

PROBLEMS IN POLLENATION.

We know that there are few cultivated varieties of fruit which are able to fertilize themselves perfectly and completely, some of our best varieties, among which may be named the Baldwin, are practically self-sterile. No complete list has ever been made showing which are able to fertilize themselves and which are not. Sometimes we find that a variety will not set fruit with its own pollen, yet that pollen can be used on some other variety and produce good fruit. There is room for a good deal of work along this line of determining just what varieties are self-fertile, and ascertaining what varieties in cross-pollenation will form the best pollenators. At this time, with our present knowledge, we can only say it is good foresight for the Horticulturist in planting an orchard to provide for cross-pollenation. In my own practice, in an apple orchard planted two years ago I planted four rows of one variety and two rows of another alternately, and would not consider it safe to plant more than six rows of one variety.

FRUIT DISPLAY AT STATE COLLEGE.

The greatest advance, however, has been made by the individual fruit growers themselves in both knowledge and methods, as was shown by the magnificent display of fruit at State College during Farmers' Week, and at the annual meeting of the State Horticultural Association in Tunkhannock January 11-13. Two years ago one table was sufficient to hold the entire fruit display at the College, and many specimens showed blemishes caused by insects and fungus. This year tables occupying a space more than 100 feet in length were filled with perfect specimens gathered from twenty-one counties and representing sixty-four different orchards.

On inquiry we find that more spray machinery was purchased than ever before. More spraying was done, not only for the control of the scale, but also for other insect pests and fungous disease. More fertilizers were bought, more intelligence was displayed in selection and application, more trees were thinned, more care was exercised in grading and packing, more new attractive packages were used, and better prices ruled as a consequence. The itinerant tree peddler has had his day in Pennsylvania, the men who plant orchards now consider carefully the question of varieties. As a rule they confine themselves to three or four leading sorts which they believe will do best in their neighborhood, and buy direct from the nurseries, with the positive stipulation—No substitutes allowed—and in other ways show that they are carefully studying their business.

HORTICULTURE AT STATE COLLEGE.

To sum up this whole subject, I would say the greatest need of the fruit industry in Pennsylvania to-day is men properly trained for the work. I am led to believe that a great many of our fruit growers keenly feel this need, from the increased interest which they took in horticultural subjects at State College during Farmers' Week. Two years ago out of the 400 farmers present, 40 or 50 attended the horticultural lectures; this year the lecture rooms were crowded to the doors, with many standing in the hall unable to get in, and they not only attended the lectures, but they asked questions and discussed the subjects with intense interest up to the limit of time.

Professor Watts, head of the Department of Horticulture, has a fine class of young men specializing under his direction; he has them thoroughly enthused with their work, they are earnestly striving to get all out of their college course that they possibly can. Professor Watts is doing his utmost to give them what they want, but is greatly hampered in his work by not having a proper building for their use. The trustees have twice asked the Legislature for an appropriation for a horticultural building, the item has twice been cut out of the bill. It is time that this industry should receive the recognition at State College which its importance deserves, and this State Board cannot do anything that will so greatly aid the fruit interests of the State and be of such lasting benefit to the farmers' boys than to secure for them this building in which they may be prepared for their life work.

The CHAIRMAN: The report is now before the Board. What action will you take upon it?

MR. HUTCHISON: I move it be received and printed in the proceedings.

The motion was seconded, put and carried.

The CHAIRMAN: It is now open for discussion or any questions you may wish to ask.

The SECRETARY: There seems to be no disposition to discuss this report. The report is certainly very complete in itself and I hope that the Committee on Resolutions will take up the matter that was suggested, a recommendation on the part of this Board for an appropriation sufficient to erect that new horticultural building at State College. I hope the Committee on Resolutions will take up that matter and bring in a resolution covering it in their report. Of course, I have no right to insist upon anything of that kind, but it seems to me that that would be the proper way to bring this matter before the Board.

I have another matter in my mind. Mr. Chairman, this morning I made the announcement that there is in the old Executive building a very excellent industrial and educational museum, and since that time, without solicitation upon my part, I am glad to say, there has come to me an invitation not only to come over myself after the adjournment of this session, but to have the Board come also. I wish to read this invitation and then I will be glad if some one will make a motion that we accept the invitation. We have gotten through with our program for this afternoon. I think we can spend a profitable half hour over there. The invitation is addressed to myself and is as follows:

"A cordial invitation is extended to you and to the Members of the Pennsylvania State Board of Agriculture to call at the Museum at the close of your afternoon session, either to-day or to-morrow, to see some beautiful colored lantern slides on agricultural subjects. These slides are for free use throughout the State."

I think if you see these slides you will be glad to get the loan of them in order that they may be exhibited in the counties and communities from which you come. I will be glad if someone will make a motion that we accept the invitation.

MR. McGOWAN: I move the Board accept this invitation at the close of this session.

The motion was seconded, put and carried.

MR. FENSTERMAKER: Before we adjourn, I would like to change the hour for the meeting of the Executive Committee to 3.30 here, in order to give them all an opportunity to see this exhibit.

PROF. SURFACE: Before we adjourn, I would like to say a word in reference to the orchard demonstrations we will shortly begin. Great many have asked that we select their places for orchard demonstration purposes. At the other end of the room we have a map on which the pins show the places where these orchards will be so far as the present selection is concerned. We shall be glad to confer with the members of the Board concerning the position of these orchards in their districts. We have selected from two to three public meeting orchards in each county in the State at which we propose to have public meetings and give instruction in the proper care of trees with reference to pruning and spraying for San José Scale and Codling Moth as they are the chief enemies of fruit in this State. In the fall we will have public meetings to study the results of the work. Incidentally there are about 175 of these public-meeting orchards. About 600 persons have asked us to take their orchards for this purpose, and while we cannot do that, we have taken their orchards as supervising orchards and have an expert to look over these. The black pins represent the supervising orchards and the white pins the public meeting orchards, and the members of this Board who desire to ask further questions about it can confer with me or Mr. Herr and see where these orchards are located. We shall be glad to have your co-operation in bringing this practical method to your communities.

MR. HUTCHISON: Mr. Chairman, we have with us one who was a former Secretary of Agriculture. I know we will be glad to hear from Prof. Hamilton.

ADDRESS OF PROF. JOHN HAMILTON.

I try to get to this annual meeting that I may have the pleasure of looking into the faces of the members of this State Board. I am glad to come back not only to renew old acquaintance, but also for a reason that a friend of mine gave for returning to his old home town. He said that he tried to get back once a year to avoid having the boys on the street inquire: "Who is that old fellow?"

While sitting here listening to your discussions, I have been looking over the list of members and have been rather startled to find that there are only two living who were present when this Board was organized in 1876,—Secretary Edge and myself. I have been greatly interested in the work of this Board from its organization, for it marked the beginning of what has developed into a great movement, the carrying of the discoveries of agricultural science out to the people on the farms.

This Board and others like it have I think been of as great if not greater service to agriculture than any other organization or set of organizations. It made known to the mass of people the fact that there was such a thing as agricultural science, that it was something that men could take and use, and they demonstrated that the truths of science could be made intelligible to men who had never had the advantage of scientific study. This Board through its farmers' institutes has educated the public to appreciation of agriculture as a profession to an extent that could not have been done by any other agency.

The Board has done another thing,—it has shown the agricultural colleges their duty, that they are not to be content to sit in their class rooms and teach 25, 50 or 100 or more young men, but that they are to go out to the great body of people who cannot go to college and teach the truths of agriculture to them as well. In recognition of this duty, the Association of American Agricultural Colleges and Experiment Stations last August at their meeting in Portland, Oregon, changed their constitution to provide for a section on extension work. Formerly there were but two sections in the Association, one on college work, that is interior instruction, and the other on experiment station work. Every land grant college, therefore, is now virtually pledged to the establishing and equipment of a department of extension in agriculture, and they are going out to teach the people much in the same way that this board of agriculture has been doing, only in a more specific and systematic manner.

In order to provide for this new work, a bill, making appropriation for its support, has been introduced in Congress, and is now before the committees of agriculture of the House and Senate. The bill appropriates ten thousand dollars to each State and Territory for the aid of extension work by the Land Grant Colleges, and after two years a sum in addition equal to any appropriation that a State may make not to exceed one cent per capita of its population. In Pennsylvania, where we have about seven millions people, if our legislature would appropriate seventy thousand dollars for extension work we would get a like amount from the general Government in addition to the ten thousand dollars originally given.

What you have done to bring about this action by the association of colleges and stations is seen in the unanimity with which they agreed to the measure. On a yea and nay call only nine votes were cast against it, and to the surprise of its friends, the vote was permitted to be taken with comparatively little preparatory discussion. Many of those who voted had previously been engaged in institute teaching until it was no longer a question with them as to the value or practicability of the method. These points had been conclusively shown by the institute experiment which the boards of agriculture had conducted.

In the United States today twenty-five agricultural colleges have already organized extension departments. Minnesota has 15 men doing extension work and nothing else; other States have a less number, but all are in earnest and are ready to extend the work as rapidly as means for the purpose can be secured. I predict that the time will come when the larger part of the work of the land grant colleges will be extension and not interior. They will have the interior

work of course, for a great body of teachers will have to be prepared for extension work, and for teaching in the normal, high, and common schools, and for research and investigation work in the experiment stations.

In each state there are three great institutions that are going to be held responsible for the uplift of agriculture,—the agricultural college will be responsible for the educational side of the work; the experiment station for securing new truths and better methods to be put into practice by the people; and the State departments of agriculture for the administration of law, for the enactment of new laws and methods for protecting the people against fraud and adulteration, and the protection of crops against depredation by insects and fungous foes, and animals against contagious and infectious diseases.

There will be minor organizations and institutions as poultry associations, horticultural societies, breeders' organizations and the like, but any of one of these may fail to do its work and no one will hold it responsible; but should either the college or station or the department of agriculture fail the public will hold its governing body responsible and should hold them to account because upon these bodies the salvation of agriculture lies. What is to be done outside will be in co-operation with and not independent of these institutions.

I feel therefore that the Board can congratulate itself that is has brought about this wonderful revolution in agricultural education and progress, and that it has done it in such a brief period; that a movement begun in weakness comparatively few years ago has grown until it has become national in its scope and hundreds of thousands of farming people are being benefitted by it. Last year about three millions of people were in the farmers' institutes in the United States. It is going to take a large amount of money to carry on this extension work by the agricultural college in Pennsylvania, and this Board can do no greater service than help to get it.

Some one asked "What shall the Board do next?" There are many things to do. The Board has prepared the way for what we have. It may now take up some new features in extension in agriculture and experiment with them and demonstrate the best methods for carrying them on. There are the boys' and girls' institute. The Board can show educators how to reach the young people on the farms with agricultural information so as to keep them on the land and away from the fevered and precarious life of cities. The Board is going to show school teachers how to teach agriculture in the public schools, and they are going to take up that hitherto neglected work, the women's institute, and develop it into an organization equal at least to the institutes now operated for men. What is possible in this direction may be seen in Canada. Ten years ago women's institutes were started in the Province of Ontario. Last year they had an attendance of 119,000 women, while the farmers' institutes organized 25 years ago had only 110,000 in attendance. The women meet once a month and are educating each other as no other agency yet devised has been able to do. I would like to see the State Board of Pennsylvania and the Department take the advance in this women's institute work. We have not done much in this direction as yet. We have been busy taking care of the men, and have to a great extent neglected the home life on the farm. There is great need for the improvement

of country homes and it is work fitting for this Board and this department and worthy of the best efforts that they can exert.

I am thankful that I have been permitted to be identified with this Board both as a member, and later as its secretary, and my heart goes out to you because of the noble work that you have accomplished during the years of your association as representatives of the agricultural industry of the State.

MR. FOX: Mr. Chairman, my friend, Mr. Sexton, of Montgomery county has asked me to make a brief statement in regard to the organization of the State Board of Agriculture. My friend, Prof. Hamilton, referred to it as having been organized in 1876. The Act was approved by Governor Hartranft in 1876 and the Board met for organization on the 26th of January, 1877, and of the sixteen members who were present then I believe there are but Prof. Hamilton, Secretary Edge and your humble servant now speaking to you, who was voted for the office of Secretary, and now after thirty-three years this young man talking to you is proud to be with this State Board of Agriculture today.

The SECRETARY: Prof. Hamilton made the remark that he is looking to Pennsylvania to start this work of inaugurating the Women's Institute. Pennsylvania, believing as it does in Prof. Hamilton and almost everything that he advocates, was very ready to undertake the movable school work and see how it was worked up so that they might get out all over the country. That is something that is practical. But I am afraid that Prof. Hamilton will have quite a little tussle with the present Secretary of Agriculture and Director of Institutes before he can get them to believe that it is exactly right to put the women up in a little company by themselves. We would rather have them meet with us. The institute that is good for the men is good for the women also, and we, at the present time, believe in the co-education of the sexes. Now, we are open to conviction. I am not speaking for Mr. Martin. I am speaking for myself, but I think possibly he entertains the same thought. We are open to conviction. We are willing to hear the arguments, but don't be surprised if we move a little slowly in that direction, because we would like to have the good women right in our institutes. We don't want to put them off in a drove by themselves.

MR. HUTCHISON: We have had two ladies' sessions of institutes. I can't recall whether Prof. Menges got to stay or not. They made a contract with me that if they turned these sessions over they would hold them. I was to keep still. Now, they organized them, held their meetings and I want to tell you they were good working institutes and their papers were way ahead of our local papers. They took up subjects of vital interest to our community. They took up the schools and school directors and kindred questions and they threshed them out thoroughly. They took up home making and things all along the line and I have never had institutes more interesting. They made a demand upon me this year. We are going to have another. It brings out a talent we did not realize we had in our community. I think it is a proper plan to have a session. Let them have an evening session. Give them the full sway. Let us see what impression our institute work is making; whether it is bene-

ficial. I tell you the ladies on the average will read better papers than our men, will give more thought and bring out more on the subject two to one than the men of our community will at any institute.

The CHAIRMAN: Is there anything further on this topic, or any other business before the Board at this session?

MR. HUTCHISON: Governor Beaver, haven't you some warm words here?

The SECRETARY: We are always glad to hear from Governor Beaver.

ADDRESS OF GENERAL BEAVER.

Mr. Chairman, I feel very profoundly on this subject of the control of the women's organization along this line. The idea of George Hutchison standing up and telling a lot of women how to cook is simply nonsense. They could all take him in their kitchen and set him to work and have nothing to eat. That's a simple proposition. But if you want to educate women in this State along the lines of home economics or domestic science, you can call it what you will, you have got to get the women educated first of all to organize their own sessions and to have them ministered to by the women. The idea of having your Farmers' Institute instructors and lecturers standing up and taking a woman's model and telling a woman how to cut a dress and fit that model. It is nonsense. Of what interest to them, from a practical standpoint, is the study of agronomy except as to the results of it. It brings them the material out of which they are to feed their families, but how they are to do it is both a science and an art that are separate entirely from what we call agronomy as it is taught in our agricultural schools.

Now, I am glad to state that at State College we got started on this question of domestic science, home economics, and we got some of the most splendid girls in Pennsylvania there. The beauty of it is that they are so thoroughly enthused with it that they want to prepare themselves as teachers, nearly all of them, for imparting instruction on these vital subjects that go to the foundation of home-making, and when you say home-making you mean happiness-making as well as home. Our women are to be taught how to furnish a home, beautify the home, make it attractive to the inmates of the home; how to feed the inmates of the home, how to do it in the way that will be wholesome and at the same time appetizing. We have just finished a little laboratory in our women's department as we call it, for the analysis of foods to teach the women who are there the chemistry of foods so that they may know just as well as the farmer has to know what he had better feed his steer, what chemical elements enter into the food that is best for the steer. Isn't it just as important then for our women to know the chemical elements that enter into the foods that are best for her husband, her boys and girls, as well as the farmer who goes out to his barn ought to know what enters into the

chemistry of his feeds he gives his cattle? Of course you can use such and such proportions of protein, etc., and when the cattle have taken on the fat that brings the result. But you don't get the same kind of results from the man. But the woman who can increase the gray matter up here (indicating his head) and put that into the production of the things that go to the steer after all makes the man a greater element, and great agent for the productive results of the farm. It is the gray matter all the time, and the woman that knows what to give to the man to increase the gray matter instead of making him corpulent is the woman you want.

The difficulty, of course, that we experience at State College and the difficulty you experience in town is, that when the woman gets to be just exactly what you want her to be for the place which she fills, some fellow comes along and offers a bigger salary,—not dollars and cents, of course, but in the home application of the home economics, of what she is master. Yesterday, to my utter disgust and disappointment, I might say, Dr. Sparks said to me, we are going to lose our woman's instructor. I said, "How is that; some institution offer her a bigger salary? He said, No, but some other fellow has. Whilst you meet with little disappointments of this sort, I believe most heartily in what Prof. Hamilton has advocated in the education of the women along the lines of what a woman ought to know in order to make her home the best place on God's earth and to make it the happiest place for her boys so that they stay by her as long as they live, at least as long as they can. Maybe in the next generation they may get a woman who may make a better home than our mother has; and though I have just as good a home as there is in the world, there are some things my mother did, some things your mother did, that come home to you that another woman cannot do just as mother did them.

The SECRETARY: Mr. Chairman, I have not given up this matter yet, but after what General Beaver has said I don't think it is any use to make another speech, notwithstanding I am not convinced yet.

MR. DURNALL: May I have two or three minutes to make some suggestions. We have been reading through the press of our cities for sometime much with reference to the high cost of living. We are having it investigated by Congress and by various bodies throughout the country. We are having it written up by our various papers, throughout our cities especially. The farmer boys on one hand are invited to go and stay upon the farm, rather than go out upon the highways of the city, and to make a success at farming by improving the stock, by improved fruit culture, by improvement in the raising of cereals, and so forth, by intense farming, that thereby they may be making agriculture more profitable and receive the increased emoluments therefrom. That is the inducement that is held out to them. We are improving along all these lines. So soon as we are beginning to reap the benefit of these improved farming methods, we are met with the hue and cry because the apparent cost of living has increased, has raised, that farmers are a trust and should be searched; that the farmers are charging too great an amount for beef, when I see by to-day's papers that beef upon the markets are from five and a half to six cents a pound; that good butter can be bought and has only

paid the producer about thirty to thirty-five cents on the average; that they should be put down. To-day all the press of the city of Philadelphia are abusing the farmer along these lines.

I would like that, through the State Board of Agriculture, we might raise someone champion to defend the rights of the farmers and to set it before the public in a just and true light; that we are now being abused and unjustly so; that we are not getting our just dues, but that the middleman and the retail dealer are the ones that are profiting thereby. I mention this, that our Committee on Resolutions may possibly bring it to the public mind.

MR. A. P. YOUNG: As a member of the Committee on Resolutions, I would request that the gentleman formulate his ideas into a resolution and give it to the Committee.

MR. DURNALL: I will meet with the Committee and assist them.

The CHAIRMAN: Is there any other business before the Board this afternoon? If not, we are ready to adjourn.

MR. FENSTERMAKER: The Executive Committee will please meet here immediately upon adjournment.

On motion adjourned at 4 P. M. to meet at 7.30 P. M.

Wednesday Evening, 7.30 P. M.

S. S. Blyholder, Third Vice-President, in the Chair.

The CHAIRMAN: Gentlemen of the Board, you will please come to order.

The first thing on the program for this evening is the Report of the Committee on Fruit and Fruit Culture, D. A. Knuppenburg, Chairman.

Mr. Knuppenburg then read his report as follows:

REPORT OF THE COMMITTEE ON FRUIT AND FRUIT CULTURE.

By D. A. KNUPPENBURG, *Chairman.*

As Chairman of your Committee on Fruit and Fruit Culture, I beg leave to report as follows:

Yield in apples, not a full crop. In some places very good; others poor. Upon the whole a very good crop considering the unusually dry season. Prices range from 25 cents to $2.00 per bushel. Peaches were a good crop and brought from 75 cents to $2.00 per basket. Pears, plums and cherries gave very satisfactory returns.

New insects and diseases appear. A punky brown spot shown in depressions in the skin, chiefly in the York Imperial and Baldwin, damaging fruit many thousands of dollars in Pennsylvania and no remedy yet known.

A new pest called the Apple-seed Chalcis, has appeared. The apple ceases to grow at about one-third or one-half natural size and remains on the tree with a peculiar pinched appearance until fall, when its beauty and usefulness is nearly gone. In the seeds of this dwarfed apple we find a white maggot filling the seed cavity. A remedy for it is wanted. Plant lice, Codling moth, San Josè scale, and other insect pests have been unusually active, owing to the warm dry weather so favorable to their development. The Frog Eye or round leaf spot has continued to spread over the State. When sprayed with dilute lime and sulphur wash or Bordeaux mixture the disease was checked.

The various kinds of blights were not as destructive as usual owing, perhaps chiefly to the dry weather and consequent slow growth. This condition also probably accounts for the general absence of other plant diseases, such as brown rot or ripe rot, melon blight, potato blight, etc. A new fungicide that proved satisfactory where used, not strong enough to injure the leaves, was found in the lime-sulphur solution, both the self-boiled and the dilute commercial.

Still another pest, which is neither disease nor an insect, is the Leaf Blister Mite. This is more like a very minute spider, which lives in the tissues of the apple and pear leaves, making them look rough with blisters, which causes the leaves to fall prematurely, giving the tree a decidedly unhealthy appearance. It is prevented by spraying the trees thoroughly with the lime-sulphur wash just before the buds open.

Apples grown are Yellow Transparent, Summer Rambo, Red Astrachan. Among the old varieties the Jonathan brings the highest price, $6.00 per barrel. The Smokehouse, Baldwin, Northern Spy, Rhode Island Greening, York Imperial and Ben Davis, with increasing demand for Twenty Ounce and Fallawater. In the northern half of Pennsylvania the King and Gravenstein have been profitable. While Grime's Golden is rapidly coming into prominence, its running mate, Staman's Winesap is doubtless the best all around apple now being placed on the market. Among the new varieties, the Stark is worthy of mention and trial. Two high grade apples that ought to come into prominence are the Bonum and Mother apples; large, red, subacid, rich, delicious, and good keepers. However, we think it best to plant fewer varieties and those best adapted to your soil and climate.

ORCHARD MANAGEMENT.

We know of no commercial orchards that have been handled by the clean culture methods, although most of the successful peach orchards have been handled by clean culture. The method most common is the plain sod, but this means starvation to the trees unless fertilizers or manures be used. A good system is the sod mulch; by covering the sod with mulch as far as the branches extend. Mr. Earl Peters of York county has a fine four-year old apple orchard which he mulches with small brush with the leaves on, which seems to answer the purpose as well as straw. The branches hold the leaves from blowing

away. Leaves hold moisture and furnish fertility as on the virgin soil. This orchard made twenty-three inches growth last season. For hillsides or rocky fields that cannot be cultivated, and where straw or manure cannot be had for mulch, this system, supplanted by the addition of some commercial fertilizer, should prove valuable. The best method for any young orchard that can be cultivated, is clean culture from early spring until midsummer, then sow clover or other legume for cover crop to plow down the following spring.

Through the influence of the great work that is now being carried on by the State Department of Agriculture, through the Division of Zoology and Farmers' Institutes, assisted by our State College, the farmers are taking courage, as they learn proper orchard management, the care of fruit and how to market it. It is estimated by good authority that Pennsylvania has now growing within its borders 33 per cent. more fruit than she had twelve months ago. The State demonstration orchards are proving that San Josè scale *can* be controlled. Codling moth suppressed, and clean well colored *excellent flavored* fruit *can* be grown in Pennsylvania,, second to none in the United States. We have proof that fruit trees can be grown in our State of Pennsylvania as fast as in California, Oregon or Washington. In view of these facts and our nearness to the best markets in the world, Pennsylvania should move right up to the front and take her place where she rightfully belongs.

The meeting of the State Horticultural Society at Tunkhannock, Wyoming county, on January 11, 12 and 13, 1910, was well attended, and the good work done there by those in charge merits words of commendation. Such meetings held in the different fruit-growing sections of the State does a work that is highly appreciated by the people and will bring forth fruit a hundred fold in due time.

The CHAIRMAN: You have heard the report. What action will you take on it?

On motion the report was received and filed for publication with the proceedings.

The CHAIRMAN: The next on the program is the report of the committee on Roads and Road Laws, John C. Weller, Chairman.

Mr. Weller then read the following report:

REPORT OF THE COMMITTEE ON ROADS AND ROAD LAWS.

By JOHN C. WELLER, *Chairman.*

The very dry summer and fall were favorable to road making and the continuous sunshine caused the dirt roads to remain in good condition until winter began, the frozen condition of the ground and the snow in many localities have made excellent roads during the winter months up to the present time.

In reply to a request for the latest annual report of the Highway Department, I very kindly received a communication culled from the report for the year 1908, now in the hands of the printer, outlining

the work done by the Department during the year, which, I trust, will be of interest to the members of the State Board of Agriculture, and which I now offer as part of my remarks.

"The reconstruction work of the State Highway Department was successfully carried on in sixty counties, the counties in which no work was done being Juniata—because of no application being filed asking for State aid; Fulton and Susquehanna counties—because of the failure on the part of the County Commissioners to agree to proceed with the work; Pike and Wyoming counties, because the agreements to proceed with the work were signed too late to allow the work being commenced; and Lawrence county, because of the lack of sufficient funds to proceed with work for which bids had been received. 241 miles of township roads were reconstructed. 359 miles are under contract, of which 181 miles have been completed but not accepted from the contractors.

"Bids have been received on 11 miles additional to the mileage under contract. 566.2 miles have been fully completed and accepted from the contractors since the work of reconstruction began in 1904. The average cost of all work completed, based on a stone or brick road 16 feet wide, including bridges, culverts and drain pipes, is $2.26 per lineal foot, or $11,922.80 per mile. The cost of all additional work is 9.1 per cent. of the total cost of the roads. The cost of engineering on all roads so far completed averages 1.9 per cent. of the total cost of the work. The cost of inspection on all roads completed is 2.6 per cent. of the total cost.

"The building of bridges has been part of the work of the Department in connection with the reconstruction of township roads, and these have cost to date $584,222.14. Had these bridges been in proper and substantial condition, as they should have been, the average cost of reconstructing the roads would have been about $700.00 per mile less.

"During the year the Department has laid 232,108 square yards of brick pavement in reconstructing township roads, which yardage, figured on the basis of 16 feet in width, gives 24.73 miles. This work has been at a cost of $481,566.72 complete, or an average of $19,472.93 per mile. The average cost of all roads is $2.26 per lineal foot, or $11,922.80 per mile; deducting the cost of the brick roads the average for telford-macadam roads is $10,577.98. Bids recently received show that the average cost of reconstructing roads with bricks will be materially less than the present average of $19,472.93. While the average cost of a road resurfaced with bricks is about 90 per cent. over that of a telford-macadam road, yet the average annual cost of repairs for fifteen or twenty or even twenty-five years in many cases should be practically nothing if those having in charge the maintenance of the roads will see that the ditches are kept open and all drain pipes and culverts kept clear of obstructions. In Greene county about four miles of brick road will be laid the coming season at a less cost per mile than a telford-macadam road. 2,139 applications on file call for the reconstruction of 4,190.7 miles of road. The detailed cost of each road built the past year is shown in the attached schedules.

"The Department has also during the past year reconstructed several sections of road with concrete, at a cost slightly in excess of the telford-macadam road, for the purpose of preventing destruction by

high water, and, in the case of Mauch Chunk borough, to overcome the destructive force of automobile traffic. This section of road has a grade of 10 per cent. and had been badly ravelled from the traffic and was reconstructed as follows:

"All the macadam was picked up and screened twice, first through a one-inch mesh, which removed all stones under one inch size; and second, the residue was then thrown on a one-half inch mesh, thereby removing the dust. The larger stones, 1½ inch to 1 inch, were used as the aggregate of the concrete and mixed in the proportions of 1-3-6 with bank sand and Portland cement. The mixture was deposited on the exposed telford, which had previously been swept clean and well sprinkled with water, and was tamped until about one inch of mortar showed on the top. The three-fourth inch stones were then sprinkled on top of this mortar and tamped until they were embedded about three-fourths their size. The dust obtained in the process of screening was then thrown on top of the work and the whole allowed to set one week before the travel as turned on it. This form of construction makes a good road, somewhat rigid for horse traffic, but one that will fairly well withstand the automobile traffic, and it is the intention to have more of it laid in the future.

"Several sections of bituminous-macadam road have been put down which at the present time are in good shape and look all right, but before this method of reconstruction can be adopted additional information as to the best methods to be pursued and the best material to be used is desired. It is, however, the consensus of opinion that some such construction is necessary to withstand in part the automobile and other heavy traffic. Surface treatment for dust prevention is, at the best, but a temporary or makeshift plan. To get the best results the bituminous material should be incorporated with the mineral aggregate.

"In order to know that the best material is being obtained or that the Department is getting what was contracted for, it should have a laboratory and be authorized to employ a chemist to make the necessary tests, not only of bituminous material but of cements, stone, bricks, or any other material used in road construction work.

"The bituminous-macadam road will cost about 25 to 35 per cent. more than telford-macadam roads, but it is supposed the cost of maintenance will be much less.

"The question of new methods of construction and of maintenance received considerable attention and were pretty thoroughly discussed at the First National Road Congress held in October last, in Paris. The representatives from the United States who attended the congress seem to be unanimous that the methods of construction in this country are equal to if not better than those in use abroad, but that the system of maintenance in this country is far behind that in use in England, France, and the other countries having good roads. Much bituminous material is used in the maintenance of stone roads abroad.

"One hundred and thirty-six plans for road work were received by the draughting department, of which number one hundred and thirty were completed and approved and which covered two hundred and thirty miles of road. For these plans there were designed one hundred and ninety-eight bridges and culverts. The bridges if connected would make a continuous span of 2,791 lineal feet. Standard plans

have been completed for culverts and bridges of all spans from four feet to eighteen feet inclusive, and also standard sheets for all detail work. Work on county road map surveys and plans has been pushed as rapidly as possible and another year will see the same work in several of the counties completed and the maps platted. In addition to the regular plans for bridges to be used in reconstruction work, several plans for bridges have been furnished to county commissioners at their request and plans for small bridges and culverts have been furnished to borough and township authorities. Profiles and grades have also been furnished several boards of township supervisors at their request, with a view of changing the grades of township roads. The effort being made by many boards of township supervisors to better the condition of the public roads, by putting in permanent bridges in place of the old wooden ones, cast iron, concrete or corrugated pipe for drainage and the getting rid of the 'thank-you-ma'ams' is to be commended. The Department is always ready and willing to aid and assist any township in making such improvement if requested to do so by the township board of supervisors.

"Meetings of county organizations of supervisors were held in several counties with good results, the supervisors taking an active part in discussing various topics brought before the meetings. There should be a county organization of supervisors in each county, and eventually a State organization of supervisors. These organizations will be of mutual advantage and assistance to the Highway Department, being educational, and enabling the Department to keep in better touch with the supervisors and to obtain a better knowledge of the work being done by the several boards of township supervisors.

"The National or Cumberland Road which crosses the State through the counties of Somerset, Fayette and Washington, six and one-half miles in Somerset, thirty-five miles in Fayette and forty and one-half miles in Washington, a total distance of 82 miles, has been placed in as good a condition as possible with the funds at the disposal of the Department. The road was in a very bad condition when placed under the care of the Department in 1905; all of the bridges were in a very dilapidated condition, several having fallen down. The first care of the Department was to put the twenty-four bridges on the line of the road in repair and rebuild those that had fallen down, all of which except four have been either rebuilt or repaired, at a cost of $58,519.35. Seven and six-tenths miles of the road have been reconstructed and put in first class condition at a cost of $99,725.34. $7,961.12 were expended for labor and material for ordinary repairs. About five and one-half miles of the road is in the boroughs of Uniontown, Brownsville, Washington and West Washington and is being maintained by the respective boroughs through which the road passes. On many sections of the road traveling is dangerous because of washouts, and all of the road is very rough except the sections recently reconstructed. An appropriation, say of $350,000.00 should be made which would enable the Department to put the whole road in first class condition within the next two years. The sooner the road is put in first class condition the better, and the biennial appropriation need not thereafter exceed the sum of $25,000. It would also be on the line of economy for the State to own a suitable stone quarry, a portable stone crushing plant and a steam roller. The Old Pike or

Cumberland Road is the property of the State and must be maintained by the State and should be so maintained as to be a fitting object lesson to that section of the Commonwealth.

AUTOMOBILE DIVISION.

"The number of motor-vehicle licenses issued for the year 1908 was 25,179, being an increase of 4,399 over 1907. About one-fourth of the total number of licenses issued were to non-residents. The gross receipts for the year were $75,723.69, which amount was paid over to the State Treasurer. The expense of operating the Division for the year was $22,866.67, leaving a balance of $52,857.02 for the use of the State Highway Department, of which sum $20,000.00 was appropriated by the Legislature for experiments and tests, leaving an unappropriated balance of $32,857.02. A portion of the amount appropriated was used in the testing of rocks and other materials to determine their value for road construction purposes. Another portion of the fund was used in laying experimental sections of road with bituminous material and also with concrete. Additional experimental work along these lines will be done in 1909."

Since the organization of the Highway Department in 1904, I can safely say that not more than one thousand miles of road has been reconstructed in the entire State, and as it is estimated that there is more than ninety thousand miles of road in the State, we cannot hope to see in our day and generation a very large percentage of the roads reconstructed, unless the State is more generous in the future than in the past in voting State aid.

It is upon the dirt road that we must largely depend to market our products of the farm. How to improve the dirt road is the vital road question for us to-day. When it is nicely rounded and free of loose stones and compact as it is during most of the summer months of the year, it is then the ideal road for the comfort of both man and beast—no pattering of hoofs or rattle of wheels, almost noiselessly we move along.

At our meeting in York last May we listened to Mr. King, of Missouri, tell us how with the Split Log Drag they very much improve the dirt roads of the Western States, and there are many roads in Pennsylvania upon which it could be used to good advantage. The road scraper or grader has done much in shaping the dirt roads of the State at much less expense than with plow and shovel.

It is during the rainy season that the dirt road is at its worst condition; then it seems to be bottomless. Could there not be a dirt road constructed with a telford foundation? In many localities where stones are plentiful I believe it would pay to plow the dirt road bed and remove to the side of the road, then use large stones for the foundation, then macadamize the top and use a light covering of dirt. In summer it would be a perfect road and during the rainy season the mud would not be deep.

The last Legislature amended the Road Law of 1905 by making the road tax payable in cash, and any district wishing to return to a work-tax can do so by a majority vote of the citizens of the district. Any township which shall have collected its road tax in cash shall annually receive from the State fifty per centum of the amount of road taxes

collected in said township, as shown by a sworn statement of the board of supervisors. This act carries with it an appropriation of $500,000.

It has been argued that much better labor could be secured on the roads by paying cash than by giving credit on labor tax. In some districts that have adopted the cash system the supervisors are not very loud in their praise of the change, saying they have difficulty in getting good workmen. How to secure better roads is surely a difficult problem to solve.

The CHAIRMAN: Gentlemen, you have heard this report. What action do you wish to take on it?

On motion the report was received and filed for publication with the proceedings.

The CHAIRMAN: The next on the program is the report of the Microscopist and Hygienist, Prof. C. B. Cochran, West Chester, Pa.

Is Prof. Cochran present? He does not seem to be present.

The next on the program is the report of the Entomologist, Prof. Franklin Menges, York, Pa.

Prof. Menges then read his report which is as follows:

REPORT OF THE ENTOMOLOGIST.

By PROF. FRANKLIN MENGES, *York, Pa.*

SPRAYING.

Many farmers and also fruit growers have been disappointed with results of spraying and have become somewhat doubtful, not about spraying, but about spraying mixtures. The causes for these failures are usually too intricate and varied for the average farmer and fruit grower to fully or even partially understand. The failures may be traceable to not applying the spray at the right time when the insect is in the right stage of development for the spray solution to be effective, or the wrong solution may be applied, or the solution used be such that it effects the vitality of the trees and the fruit buds so that inferior fruit or no fruit at all will be produced.

SOME EFFECTS OF SPRAYING.

In the springs of 1907 and 1908 I sprayed my peach trees with an oil mixture at the special request of an agent of the oil sprays. Previous to this I had sprayed with the lime and sulphur mixture and had large crops of fruit every year and the trees were free from scale. During the summer of 1907 the trees yielded not over a fourth of a crop of peaches and they became so badly infested with San Josè scale that I was obliged to spray in the fall which should not have been necessary if the representations of the oil sprays agent had been correct. But my confidence in the oil sprays, or rather in the rep-

resentations of the oil spray agent, had been established and I attributed the scale infection to the English sparrows having carried these from neighboring trees, none of which had been sprayed and were full of scale. Not only were the trees infected with the scale, but they had lost their former vigor and during the summer of 1907 very small peaches appeared here and there on a Schmauk tree. I had heard of what is called "little peach" but thought likely there was no such thing on my trees. In the spring of 1908 one of the most vigorous of my experimental trees was dead. This spring I again sprayed with the oil mixture. This year the crop of good fruit was very small but the crop of "little peach" was all one would hope for had they been large. In conversing with peach growers I told of my experience and by them was told that I had "little peach" and that the only thing to do was to cut down the trees and to burn them. I did not cut them down and burn them; neither did I spray in the fall of 1908. In the spring of 1909 the trees were not in appearance or vitality what they had been before I sprayed them with the oil mixture and therefore concluded that they had about enough of that kind of treatment and I then sprayed them with the lime and sulphur mixture. The spring weather was rather unfavorable, especially during the blossoming season when we had days of rainy weather and hard rains which lasted for hours and which did much damage to the blossoms on the side of the trees upon which the strong wind blew the rain. I saw apple trees in some of the Adams county orchards which were exposed to this storm that had very few apples on the side of the trees exposed to the direction of the wind and rain, so that if the failure of the previous years could have been attributed to climatic conditions, or the "little peach" to injuries to the buds there was sufficient reason for not having fruit and for "little peach" this year. During the summer of 1909 I had a splendid crop of peaches and not a single "little peach" of which I had so large a crop, especially on a Schmauk tree, the year before. I am not going to draw any conclusions, but one thing I am not going to do again,—spray peach trees with oil mixtures. I said I would not draw any conclusions but is it not evident from what I have said, and from what others have observed and experienced, that before a spray mixture is put upon the market and before it receives the endorsement of any one upon whose opinion the public has a right to rely, that it should be thoroughly tested, and not only its effects on the insect or insects for which it is applied determined, but also its injurious or beneficial effects on the vitality of the bud and tree, and not only one variety or species of trees but all varieties or species upon which it is supposed to be used.

I said the beneficial effects of a spraying substance, effects that will enhance the vitality of the tree and the buds while at the same time it destroys the enemies of the tree. Now we spray to kill injurious insects and fungi with little regard as to how the substances used for this purpose effects the trees or the fruit. We can hold in check, with the substances we now have, the insects and fungi that infest our fruit trees but of the beneficial effects of these substances on tree and bud we know little. We know that Bordeaux mixture, and arsenate or arsenate of lead and sometimes Paris green produce rusted fruit and prevents apples from coloring up right. We know that Paris green burns the leaf of potatoes and the apple and other fruit trees,

and that the causticity of our most prophylactic of all sprays, the lime and sulphur, weakens the delicate fruit buds of the apricot as well as others. When we know more we will have a spraying substance that will be beneficial to tree and bud while destroying insects and fungi.

CONDITION OF THE APPLE CROP.

This brings us to the peculiar condition of the apple crop over a wide expanse of country reported to us by Mr. D. H. Watts, of Kerrmoor, Clearfield county, Pa. Mr. Watts says the short apple crop in his section was not due to insufficient blooming but rather, as he thinks, to a generally unfavorable climatic condition that prevailed during the early stages of the growth of the fruit for a shorter or longer time. Other growers in Clearfield and other counties in which the little, knotty, deformed and highly colored apples hung in numerous clusters of handfuls on the limbs of trees think that it was the result if insect infection. But these parties have so far utterly failed to name or identify the insect pest that has committed these depredations, nor have they specified the time when it was done. Sprayed and unsprayed orchards were equally affected. Mr. Watts reports one peculiar condition that came to his notice, and likely there were others, of a small family orchard, of old standard varieties of apples, located in a damp clay soil in the valley of a small stream in which almost all the apples were perfect while in all the surrounding orchards the little apples, as already described, were plentiful.

Mr. A. J. Kahler, of Hughesville, Lycoming county, Pa., reports the appearance of what he terms the "field wheat weevil." Mr. Kahler says: "We had quite a scourge of this pest for three years commencing, as nearly as I can remember, with the harvest of 1854 and continuing during 1855 and 1856. We noticed in our wheat in 1854 that a great many grains in the heads were missing and where there should have been a grain we found a little white worm which, when full grown, was about the size of a grain of wheat. The following harvest, that is, 1855, it destroyed nearly the entire crop of wheat in our community. Field after field was eaten up and not worth harvesting. Many farmers plowed it down and others cut it for the straw. We had several fields of as fine a straw as we ever had, the grain of which was entirely eaten up.

"I will now give you a description of the insect and what it is like. They were small black flies, about one-half inch in length, and appeared in clouds on the wheat especially in the morning and evening towards sunset. They stung and deposited an egg in the hull that incases the grain. Well nigh every pod in every head was stung. We noticed that when these eggs were deposited in hulls in which the grains had about fully developed, that the little worm could do little or no damage. The only thing we could do, noticing this fact, was to try to get the wheat to develop early and we found that wherever we could get it ahead to develop the grain the first few weeks in June, the little worm could do little or no damage. In this way, in a great measure, we became master of the situation. By sowing early, by the middle of August we got our wheat out of the breeding time of the fly and it disappeared. This we continued doing until we had to sow later on account of the Hessian fly. Last summer this same field weevil made its appearance again, especially on the farm of Mr. John

King who had a very elegant field of late wheat which looked fine but when they came to thrash the wheat they found many of the grains partially eaten and large numbers of the little white worms in the screenings. When we threshed our own wheat we found quite a number of these worms and many shrunken grains, showing that they were infested."

The potato bug was again in evidence in the early part of the summer but later, evidently in the stage of pupation, either because of the dryness of the weather or because of some fungicidal or insect enemy few passed through this stage of transformation.

The greatest damage to the vegetable crops, and in many instances to fruit, was done by the aphids. The cabbage aphid was so plentiful in sections of York county that it well nigh ruined acres upon acres of cabbage and, according to a report I received from my friend, Mr. W. H. Stout, of Pinegrove, Schuylkill county, Pa., this was true of that county.

The Department of Agriculture has kept up the warfare with the insects of the State, not only by telling how to destroy them, but also by having the insecticides analyzed, especially Paris green and has thus complied with the law requiring this insecticide to be kept up to a standard of purity that when applied in quantities ranging from six to eight ounces in fifty gallons of water it will be effective in destroying chewing insects.

The CHAIRMAN: Gentlemen, you have heard the report. What action will be taken?

On motion the report was recieved and filed for publication with the proceedings.

The CHAIRMAN: The next in order is the discussion of the reports just passed over. Will you discuss them?

MR. FENSTERMAKER: I think while the report of the Roads Committee is very thorough and very good, there ought to be some discussion. It must be evident to every taxpayer of the State that by the present way of building roads we are not making very much headway. They wear out as fast as we put them down and I believe that we are actually doing wrong in asking for more money to build roads until we find out some way to hold the roads that we have, some binding that will hold the surface down. What is the use of having no binder to hold it? It will go to nothing in three or four years. We have experienced that at Allentown where we have a road about four and a quarter miles long that cost $44,000. Before the supervisors accepted the road the State spent $5,000 to put a new top dressing on top of part of it. It is now completely ruined, not only the top but also the macadam, the telford showing in nearly every part of the road and it will require at least $20,000 to get it in good shape again. This is an important question and ought not go by without discussion.

MR. CREASY: I have been trying to study this road question for a number of years and I have come to the conclusion that if we could get the township State aid for township roads I believe we could make roads satisfactory to the people and more of them than what the State is doing at the enormous cost. I do not know how it is in some of these townships where they have not built, but I know of some

townships where it is absolutely impossible and beyond the limits of the township to pay their one-eighth share besides being taxed the one-eighth share of the part the county would pay.

I was reading the report of the Commissioner of Roads of New York, and I believe they are far advanced in the road building in that state, and I believe it is the only state in the Union in which the Commissioner of Roads of the state advocates that system of building township roads. He puts it in this way: He says they have 77,000 miles of road in that state of which about a third are main traveled roads, and he says that if the people should wait until their Highway Department could build them they would all be gone and the generation to come would be gone. In Pennsylvania we have 100,000 miles of road of which 10 per cent. could be put down as main traveled roads and there would still be 90,000 miles that needs improvement. The Commissioner of the State of New York says that by giving this State aid much of these highways can be improved. Their proposition is a little different from ours. They give 100 per cent. not exceeding $25.00 per mile. I believe that it is better than our law. It is better for the poor townships. The poor townships would get the full amount per mile. They would perhaps get the amount of money as much as they spend on the roads, while on our plan the poor townships are somewhat discriminated against on this 50 per cent. business, because I doubt if they are spending over $30.00 per mile in the poor townships; so that under our law they would be getting $15.00 per mile and under the New York state law they would be getting $25.00. So I believe in our law we should advocate the New York plan. In an address this year the Commissioner of Roads of New York said they had 20,000 or 30,000 miles of these township roads under this State aid in good shape; that they were roads that were improved on lines laid down as good first class dirt roads. It seems to me that this road question, with the cost of roads up to $19,000 per mile and the slow process we are getting them, that it is entirely out of the question for us to expect the State to build these roads in the various townships. The people in the State are in favor of good roads. We all want them. I believe that if this State aid business is managed rightly, and if we get the aid that we ought to have, that the township supervisors and the people will have roads that will be passable and first class roads eleven months in the year, and good roads eleven months in the year are better than first class roads that you never get.

I think it is worthy of the people of the State to look after this road question because it is going to be settled one of these days. We are not going to be wading around in the mud and not getting any roads. The farmer is interested in the roads to the market and the railroad stations. The farmers in the township know how to build roads. The idea that they don't reflects on their intelligence. I believe that if the Highway Department of the State of Pennsylvania would do like the State of New York and would send out bulletins of instructions to these supervisors, there would be more progress made. In the last act we passed there were amendments that the State Highway Department was to issue these bulletins. The Pennsylvania State Grange News has offered a reward of $50.00 for the first copy of road instruction or bulletin issued by the State Highway Department.

The SECRETARY: The offer is not big enough.

MR. CREASY: But I do believe we could get more good roads by the system of State aid for townships that will be satisfactory to the people than what we can get under this State Highway Act. I believe that the State ought to do that on their own hook. The unfairness about this State Road Law now is, that a certain per cent. of the fund goes for maintenance, I think 10 per cent., but the amount appropriated is so small that the percentage that the township would get is so little that the townships cannot maintain these roads; cannot keep them in repair. I saw one of these roads recently that was built about four years ago and one of the best road engineers gave an estimate of $5,600 to put it in good shape. I believe to keep these roads in repair will cost on an average from $400 to $800 per mile per year. With the ordinary township, it is out of the question to spend that amount of money. That is why I believe that after all the best we can get for the various townships of the State is to get State aid for township roads, and if there is no money in the State Treasury to do that let us lay one mill on each dollar of corporate and personal property for road purposes. This Act which we passed last year was cut down one-half a million by the Senate and one-half million by the Governor. It was a half million too low in the start. I think the farmers ought to have insisted on getting that $2,000,000 appropriation and let them try it for ten years and see if we don't get some good roads in Pennsylvania.

The SECRETARY: Mr. Chairman, before we pass to the next item on the program, I see that Mr. E. S. Bayard, Secretary of the State Livestock Breeders' Association, is present and I think he has an announcement that he would like to make during our session. I think it might be as well for him to take the opportunity now.

MR. HUTCHISON: We will be glad to hear from Mr. Bayard.

MR. BAYARD: I merely want to announce, gentlemen, that the Pennsylvania Livestock Breeders' and Pennsylvania Dairy Union will hold a joint meeting next week at Philadelphia. Not only that, but we have a show of livestock of all the leading breeds of horses. I think every breed of horses will be represented, several imported from Ohio; and leading breeds of dairy cattle, in fact, all the breeds of dairy cattle; and leading breeds of sheep. Demonstrations will be made on foot and with meat animals on the block. Moreover, we have our Annual Corn Show and lectures on corn and corn growing. We have also the exhibit of the Corn Growers' Competition in Pennsylvania in which thirty men entered to grow an acre of corn. We have, moreover, the exhibit of the Pennsylvania Horticultural Society, an Apple Show. We have exhibits of milk wagons, exhibits of milking appliances, exhibits of milk and dairy products. We have an exhibit of market horses and harness. In fact, we are going to have a great big time and every bit of it is free to you and we want you to come down and help us establish on a broader foundation the livestock breeding and livestock interests in Pennsylvania in which we know you are interested.

The CHAIRMAN: The next topic on the program is "The American Farmer; His Past, Present and Future," by E. B. Dorsett, of Mansfield, Pa.

Mr. Dorsett then read the following paper:

THE AMERICAN FARMER: HIS PAST, PRESENT AND FUTURE.

By E. B. DORSETT, *Mansfield, Pa.*

THE FARMER OF THE PAST.

Many years have elapsed since the American farmer began his work of building this nation; and though he later demonstrated his great power in saving it from being rent in twain, and is now recognized as the backbone of the nation, its brain and brawn, yet there are some who are still unkind or unthoughtful enough to call him "Clodhopper," "Buckwheater," or "Rube, the Hayseed." Notwithstanding this condition, we are still living in the best country and under the best government that the sun ever shone upon; and I assume that every person within the sound of my voice will subscribe to this sentiment. In spite of the many evils which exist and the many changes that might be made for the better, and notwithstanding the uneven distribution of the nation's wealth and the arrogant manner in which capital rules, it is still the best and the greatest country on the face of the globe and I desire to emphasize the fact that "Rube, the Hayseed," has been the greatest factor in its upbuilding.

Let us follow him from the time that he landed on the shore at Plymouth Rock and took possession of everything in sight. From that very moment he has ever been the aggressor. The moral phase of his position we will not here discuss; but simply say that he was proud of his possession and gloried in his strength. He was living in the days of aggression, at a time when might made right, when men were ruled by the sword, and when the Lord seemed to be on the side of the heaviest artillery.

His first great work was to clear his farm on the rough New England hillside, and with the rocks which he dug from the soil he made a schoolhouse, in which he laid the foundation for his empire. How well he built he never fully knew; but the fact remains that the little red schoolhouse was the keynote to his success during all the ages that have passed and gone. Out of those buildings have gone not only his children, but his children's children trained and equipped for the battles of life. His early trials and struggles are a matter of history and need not be repeated here. We see him bending under the yoke of bondage placed on him by the Mother country. We see him struggling manfully to adjust the burdens of local government, until finally the yoke of oppression becomes so burdensome that he is forced to throw it off. The Articles of Confederation are superseded by the Constitution of the United States of America, and the Stars and Stripes float over the new born nation. In the selection of a President for this new nation, his mind instinctively turns to-

wards one of his own class; and George Washington, the farmer, soldier, patriot, general and statesman, was chosen for this important position. Thus, we see in the very beginning of the history of this nation, the American farmer was signally honored and justly so.

Having built well the foundation for his new empire, he now gives his time and attention to its extension and upbuilding. With his back towards the rising sun, his axe on one shoulder and his musket on the other, he turns his face towards the west and marks the course of his empire. In the Mohawk Valley he pauses and builds a schoolhouse out of the rough and unhewn logs cut from the forest. The Middle West surrendered 1,000,000 fertile acres to his plow, and here he builds his schoolhouse out of sawed boards and bricks, roofing it with shingles. Still onward, untiring and aggressive, he continues to plow the straight furrow westward and to dot the landscape with schoolhouses—forest or prairie, mountain or valley, always a schoolhouse.

He now turns and looks backward over his pathway, He sees the little old stone schoolhouse built on the New England hillside grown into a stately college, and the little clearings which he had made in the forests grown into towns and cities. On some of his roads were iron rails, over which steam cars were running, and the waterways were being plied with ships of commerce.

Encouraged by his successes and achievements, he again faces westward, though he pauses during the space of four years to settle a difference of opinion between him and his brother Jonathan in the South, as to the preservation and perpetuation of the Union, something that had become near and dear to his heart, an institution that was part of his very life and religion, one which was the outgrowth of justice and equity and the result of early teachings in the little log schoolhouse.

Firm in the belief that he was right, his Southern brother threatened to overthrow the entire fabric, and cause the dissolution and disintegration of the Federation of States. "Rube" saw the work of four generations in peril. "Dissolve this mighty Union!" He cried, "Never!" He stopped, he considered and the more he considered the more incensed he became, until finally he unyoked his oxen from the plow, brought forth his grandfather's old musket, and in the twinkling of an eye he became a warrior. The quiet, peace-loving, home-loving, hard-working, hard-fighting, and all-around-hard-to-beat tiller of the soil, takes up the trade of war, and for four long years his trade was war, cruel, remorseless war; and when it was over, when victory was won, did he boast over it, or follow up his advantages for revenge or conquest? No! He extended the hand of fellowship to his Southern brother and said: "Go back home to your cotton fields and I will go back to my corn. I have helped to save you from yourself and henceforth we will work together. In the future we will work for the glory and honor of our common country. Shoulder to shoulder we will build such an empire as the world has never seen."

In six months the farm, the shop, the mines and the professions had absorbed that mighty army whose trade had been war. There was no tremendous upheaval in the order of things, no riots and no bloodshed. Quietly and peacefully the sword was converted into a corn knife, the cannon into plow shares, and the fields which ran wet with blood in the spring were golden with the harvest in the autumn.

Match it in history if you can. Peace and harmony having been restored, "Rube" again takes up the furrow where he had left it, and with his face still towards the West he enters the great American Desert. On the alkali plains he digs an irrigation ditch, and sows its banks with alfalfa. Here his schoolhouse is a dug-out abode. In the valley of the Sierra Nevada he plants vineyards, and beyond the great range an orange grove, and geographically, the scope of his empire is complete.

THE FARMER OF THE PRESENT.

Such in brief is a history of the American farmer of the past. We find the farmer of the present still trying to solve some of the same questions, though perhaps differently stated, as perplexed his forefathers in the days of the Revolution. If taxation without representation was tyranny then it is doubly so now, yet we find that the farmer of to-day pays an average rate of sixteen mills taxation on the dollar, while corporate interests pay but four; and at the same time his voice is seldom heard in our halls of legislation.

From out of the ashes of the great Civil War, ashes sprinkled with tears of our glorious American women, and wet with the blood of her bravest and best manhood, there has developed a new menace, which is destined to make more trouble for our American farmers of to-day than did the War itself.

The power of unearned and concentrated capital is only just beginning to be felt; but the necessities of that War opened up a new and hitherto unknown and untrodden field of financial exploitation; new and untried fields for the accumulation of vast wealth. Capital ever greedy, ever ready to take advantage of every necessity, begins to make its power known. Its advance is slow, creeping, cringing and insidious. It always wears a smile, smirks and bows, and rubs its hands with glee as it creeps onward. Thus far "Rube" has taken little or no notice of this. He exchanges smile for smile, and likes to be flattered, it tickles his vanity. He is proud of his country's progress proud of her great cities and proud of her railroads, he is even proud of her captains of industry, feeling that he had a part in their creation, little realizing how great a part.

Instead of taking an active interest in governmental affairs, and in securing legislation protecting his interest, as did his forefathers, he is often careless and indifferent as to the character of the men whom he elects to enact laws, and, at times, criminally negligent in his choice of men to administer them.

How absurd then, for the farmer to growl about not getting a square deal, or to even think of getting justice and equity, either in the enactment or the enforcement of any law that is made, interpreted and administered by men whose business interests are not in sympathy with and often antagonistic to that of agriculture.

This State Board, with its splendid system of Institutes and Movable Schools, is doing much for the farmer of the present; and yet its work has only just begun. It is highly important that he should be taught some of the fundamental principles of scientific agriculture, how to secure and maintain soil fertility, how to plant and care for the orchard, how to feed and care for the stock on the farm, how to increase plant growth; and in short, how to reduce the cost and increase the production. Then, having learned all this, and having

made two blades of grass grow where but one grew before, what will it profit him, if by a system of unjust taxation or class legislation, some other fellow gets the extra blade?

This is a condition that confronts the farmer of the present and must be remedied by the farmer of the future if he would hope to win success. It has taken the farmer a long time to realize all this, it was hard for him to understand and still harder for him to believe. His rugged honesty revolts at the thought. The log schoolhouse did not teach him the art of graft, political science, nor frenzied finance, as applied to-day; but it did give him greed for knowledge, and as suddenly as before, when he became a warrior, he now becomes a reader and a thinker.

THE FARMER OF THE FUTURE.

Let us lift the veil, and as we look down through the vista of the coming years, we catch a glimpse of the American farmer of the future. We see him come forth a full-fledged, well-rounded, broad-minded practical farmer. The scales will have fallen from his eyes and all prejudice to "Book Farming" will have vanished from his mind.

Our own splendid State College will have taught him how to apply science to the art of agriculture, and having drank at its fountain, he will accept agricultural education as a necessity not only for himself but for his children. He will understand soil types, and be able to classify them with reference to crop adaptation, thus eliminating waste through lack of knowledge. The principles underlying soil fertility will have been so well-grounded into his early training that he will not only understand how to secure it, but will fully understand how to maintain it when once it is secured. Feeding the plants will be quite as profitable and fully as important as feeding the animals. He will have learned that single-handed and alone he can accomplish but little; and this fact alone will have caused him to give up that independent life which isolated him from his fellow farmers and prevented him from making real progress.

The spirit of co-operation will be an important factor in his makeup and he will always be found ready and willing to lend his voice and vote to promote every public or private enterprise that is progressive and tends to better agricultural life. He will not balk at the occasional failure of a leader, but will pull steadily and faithfully on to the end of the furrow or until the span of life has been completed.

Again, as in days of yore, we see him turn instinctly towards his own, the Grange. There he learns that the true secret of his success lies in intelligent organization. He enters her portals and there is taught that if he would win success, he must present the same solid front to the enemy that he did in the days of the Rebellion. We see him go to the polls and vote, not as the party boss dictates, but as best protects the interests of his fellow farmers and the common good of humanity, placing principle above party affiliations. Quietly he gathers up the reins, which fell from his hands at the call of his country, and proceeds to drive.

He enters our State and National halls of legislation, and as a result of his efforts, we see the State and the Nation join hands with him in building and maintaining public roads. We see the Parcel Post established, and well-managed under the improved and ex-

tended Rural Delivery, a child of the Grange. We see the citizens go to the polls and vote direct for the President and United States Senators, thus preventing, in a measure, the illegal use of money in politics, and making the individual responsible for the character of the men whom he assists in placing in office.

Lastly, we see the little red schoolhouse with which "Rube" dotted the landscape from the Atlantic to the Pacific, supplanted by the Township High School, surrounded with a plot of tillable land and well equipped with barns, built according to modern architecture, a building for manual training and a kitchen where Domestic Science is taught.

Let us enter the class room and listen to the instruction imparted. The pupils are taught that he who brings nothing but a creed, should be relegated to the past; but he who brings Christ's doctrine, "Peace on earth and good will toward men," will always be welcomed. War is barbarous and unworthy our American civilization, and he who prevents war, is greater than he who wins on the field of battle. You have entered upon an era of universal peace, and you shall say to the capitalist: "Render unto Caesar the things that are Caesar's and unto God the things that are God's."

The people have come unto their own. Henceforth you will all be captains of industry. Remember that "Rube" with his log schoolhouse, built the foundation for his empire on firmer rock than ignorance and superstition, more stable and more lasting than the rule of the sword, and more just and equitable than the rule of capital, as it is founded upon the universal Brotherhood of man and the over-shadowing Fatherhood of God.

The CHAIRMAN: You have heard the paper. What shall be done with it?

On motion the paper was received and filed for publication with the proceedings.

The CHAIRMAN: The next thing on the program is an address on "The Pure-Bred vs the Scrub Steer," by Dr. H. P. Armsby, of State College.

Dr. Armsby then delivered the following address.

THE PURE BRED VS. THE SCRUB STEER.

By DR. H. P. ARMSBY, *State College, Pa.*

Mr. President and Gentlemen of the State Board of Agriculture: All of us who have read the newspapers of late, and what good American does not, have received a great deal of information about the increased cost of living. Indeed, I rather suspect that most of us do not need to go to the newspapers to get that intelligence but have had it brought home to us in a much more practical way. Now I do not propose, of course, to discuss this very important and very complicated question to-night, and yet the matters which I have to present have some pretty definite relation to some phases of this ques-

tion. While the increased cost of living doubtless has many causes, there is certainly one fact affecting the price of food concerning which we can all agree, viz: that there are more and more of us to be fed, consequently, it takes more food to go around, and the natural tendency of that is to make the cost of food higher. Moreover, this is a question which will affect us still more in the future. A very eminent agriculturist of this country, the dean of one of our leading colleges of agriculture, predicted the other day that by the end of this century we might have a population of twelve hundred millions. Even if we cut that estimate in half and say six hundred millions, it takes no profound thinking to see that the problem of feeding five or six million people in this country will be a tremendous one. Not long ago we were warned by President Hill, of the Great Northern Railroad, of an impending shortage in our wheat crop. He ventured the prediction that within forty years we should have a shortage of four hundred million bushels a year; that we should be importing wheat into this country.

Now, whether this time is coming sooner or later, there can be no question that sometime the question of the food supply is going to be a very serious problem. The food which we eat supplies the energy which runs our bodily machinery, and this energy is derived, ultimately from the sun's rays. By means of the green leaves of growing plants the farmer catches some of this energy which comes to us from the sun and stores it in the crops which he produces, and this energy is again set free in our bodies when we consume the food products with which he supplies us. The number of people that can be supported by any country from its own resources depends upon how much of this sun energy the farmer can catch for us. But a great deal of the energy that the farmer stores up is contained in unavailable material. For instance, when he grows an acre of wheat he stores up a certain amount of sun-energy for our use, but about half of it is contained in the straw and we have not learned yet how to eat straw. Moreover, when we grind the grain, about one-fourth goes into the bran and middlings and about three-fourths, roughly, into the flour; so that out of the total energy of the wheat crop less than thirty per cent. is actually available as human food to run our body machinery while sixty per cent. is unavailable. Substantially the same thing is true of other crops, such as corn, rye and oats, and still more true of hay and forage crops which we cannot consume at all ourselves. As population increases, then, we shall be forced to be more economical in our use of the food supply. When we have a population of twelve hundred or even six hundred millions we cannot afford to throw away sixty per cent. of the energy of the wheat crop if it is possible to save any of it. Such a saving we can effect through feeding these waste products to our domestic animals, which can consume hay, straw, bran, etc., and work them over, using them to support their own bodies and leaving a surplus for human food, so that we may thus save a part of the energy that would otherwise go to waste. Now the Institute of Animal Nutrition has been for several years engaged in investigations by which we hope to get at some of the fundamental principles involved in this transformation of unavailable into available food material and to determine how much is necessarily wasted in the process and how, in any way, that waste can be diminished;—how

we can save more of this waste energy to feed the coming millions that are going to inhabit this country. It is to one particular phase of that problem that I ask your attention to-night.

We are working along three general lines. In the first place, it is important that the stock feeder of the future shall know how to use the new feeds that are coming in the market. When stock raising was simply a question of grazing the stock or of feeding the grain produced on the farm, it was a simple matter; but when we have to depend upon these strange materials, these by-products and wastes of all sorts of manufacturing operations and, moreover, must use them with the greatest economy, the problem is a much more complicated one. We need to know the fundamental principles involved better than we have ever known them in the past. We must know the relative values of these feeds; how much of the potential energy in them can be actually digested by our farm animals; how they compare with each other in this respect; how much of the stored up energy is waste and how much can be utilized and thus saved for man; how they may best be combined for this purpose. In the second place, we need to know something about the efficiency of the machines that are to convert unavailable into available matter; whether different species and types of animals differ, so that one can utilize more of this otherwise waste energy than can another. In the third place, we need to know under what conditions we should place these machines to have them work to their greatest capacity; that is, how the conditions under which animals are kept affect their efficiency in converting unavailable into available material.

What I have to say to you relates especially to the second phase, namely, the relative efficiency of different types of animals, specifically of beef animals, in converting these waste products into human food. We do not need the physiologist nor the respiration calorimeter to tell us that some beef cattle give better returns for their feed than others do. But it is not enough simply to know the fact; we want to know why. If a manufacturer of cotton cloth had machines in his mill, some of which produced 1,000 yards of cloth and others 1,200 and others 900 out of the same amount of cotton, he would not only want to know that fact, but also in just what respect some of the machines were better than others so that he could buy the better type of machines. So in the matter of beef production, we know that this animal gives better returns for food than the other, but when we find that out it is too late to do anything about it. We have expended time and feed on the inferior animal and there is no possibility of going back and doing it over again. Nor does it help us in determining the particular kind of animal which will give us the best returns next time. We need to know in just what particular the good animal differs from the poorer one. Does he digest his food better? Some say this is the reason. If that is true it is important that the breeders of beef animals should know it and should breed so as to perpetuate that desirable feature and secure beef producing animals that will have this high digestive capacity. But, if on the other hand the difference does not lie in the digestive capacity, then we don't need to bother with that. Does the beef animal make a better use of the food he does digest; does he make more meat out of the same food than does the scrub steer? If such is the case, we want to

know it and to breed from the animals that have this capacity in the highest degree, while if there is no such difference we can save ourselves that trouble and look further for the cause.

I am going to present to you to-night the results of some comparisons between the pure-bred beef steer and the scrub on some of these points, the actual results of experiments extending over about three years. We selected for this purpose two calves about ten months old. One was a pure bred Aberdeen-Angus and the other a scrub, more or less of the dairy type. We had these animals under observation for two and a half years and we tried to determine how much of their food went to waste and what percentage of it they were actually able to convert into meat for human consumption. Of course, the value of our results depends in the first place upon whether the animals selected were fairly representative of the two types. I shall let you judge of that by having projected upon the screen some of the protographs of them which were taken so that you can see for yourself what they looked like. (Photographs of the animals at three different ages were shown).

The first point that we wanted to determine was whether these animals had any difference in digestive power. For that purpose we made a series of digestive experiments. (Slides of the appliances used were shown.)

The following table shows the comparative digestibility of the hay and of the mixed grain consumed by the two animals in the third season's experiments:

PERCENTAGE OF DIGESTIBILITY OF FEED.

	Hay.		Grain.	
	Steer A.	Steer B.	Steer A.	Steer B.
Ash,	38.9	39.1	28.7	23.7
Protein,	43.8	43.6	73.4	80.3
Crude fibre,	62.8	62.6	2.1	1.9
Nitrogen-free extract,	66.1	65.1	87.5	87.8
Fat,	48.0	48.4	94.8	90.6
Total organic matter,	62.0	61.4	77.8	78.8
Energy,	58.6	57.9	78.9	79.7

I have selected these results because they are typical of all the others. In the earlier years there seemed to be a trifling advantage on the side of the scrub, while in the third year, as the foregoing figures show, there was, on the whole, a little advantage on the side of the pure-bred animal but so little as to be of no significance. In other words, so far as we can judge from these two animals, any superiority on the part of the pure-bred animal did not lie in his digestive power. Digestion is a chemical rather than a vital process, and the difference was usually very small.

In the second place, having tested this question of digestibility, we wished to find out whether one of these animals made any better use of the digested food than did the other. This is a far more difficult problem. We sought to solve it by studying the food as the source

of energy to the body, determining how much of the energy contained in the digested matter the steer was able to store up in his body and how much went to waste in the form of heat or escaped unused in the excreta. For this purpose we used the respiration calorimeter which many of you have seen. (Slides illustrating the respiration calorimeter were shown.)

Without entering into the details of these elaborate experiments, it may suffice to say that the third year's experiments with the respiration calorimeter on the nearly mature animals showed that not only did the two steers digest their feed to the same extent, but that the percentage of the energy of the digested feed which was utilized in the body, either for purpose of maintenance or for the fattening, was substantially the same in the two animals. In other words, a pound of digestible food or a unit of energy supplied in excess of that required to maintain the animals was about equally well utilized by the two mature animals.

In the experiments of the first two years, on the other hand, made while the animals were still growing, there appeared to be a distinct advantage on the side of the pure-bred steer. After his maintenance requirement was satisfied, he seemed to be able to store up a somewhat larger proportion of the energy of his surplus food and this was true both of the hay and of the grain. The exact cause of this difference is not very apparent. It can hardly have been due to the difference in age alone for comparisons upon the same animal in the successive years showed a slightly better utilization of the energy of the feed by the older as compared with the younger animals.

Another, and a very important difference in favor of the pure-bred animal, was found in the maintenance requirement. Computed to the same live weight, the scrub steer required about 20 per cent. more feed for simple maintenance than did the pure-bred animal. In other words, while the scrub was able to convert his surplus feed into meat as economically as the pure-bred, he had a smaller surplus remaining out of a given amount of total feed because he used up more of it for the simple running of the bodily machinery. The difference in maintenance requirement appears to have been due to the more nervous temperament of the scrub and his greater restlessness as compared with the more phlegmatic temperament of the pure-bred animal.

A significant difference was also found in the feeding capacity. The pure-bred animal was able to consume and utilize heavier rations than the scrub. The heavier the ration of an animal, however, other things being equal, the larger is the proportion of it which can be used for productive purposes, since the maintenance requirement remains the same. Accordingly, the pure-bred animal was able to make a more economical use of his total feed than did the scrub. This was especially marked in the third year's experiment when the animals were fattening rather than growing.

These statements are in apparent conflict with the fact that, as has been frequently observed in such experiments, the rate of growth of the scrub, as measured by the gain in live weight during the two and a half years, was fully as great as that of the pure-bred and required no greater weight of feed to produce it. The experiments seem to show quite clearly, however, that this discrepancy is due to the fact that a pound of gain in live weight contained considerably

more actual food value in the case of the pure-bred animal than in that of the scrub, the difference being largely in the percentage of water. In other words, the scrub put more water into his gain than did the pure-bred animal and consequently was able to make relatively as large gains in live weight from the same food.

The SECRETARY: Then we understand, Doctor, that by eating the beef of the well-bred steer we get more support?

DR. ARMSBY: That is what the figures indicate.

The SECRETARY: It is a very important question. I want to know what kind of beef to call for. I get pretty thin.

DR. ARMSBY: Of course, results such as these fail to touch one very important aspect of the question, namely, the quality of the carcass, the market value of the meat, and we all know that the typical beef animal has a superiority in that respect. We were not able to carry our experiments for enough to actually analyze the different cuts from these animals. We did find this: Both these steers were fattened and later slaughtered and cut up for demonstration experiments during Farmers' Week. We found that the well-bred steer carried a good deal more fat and fattened easier than the scrub. Furthermore, we were able to make analysis of certain cuts of the carcasses and we found that this same relation held true and that the meat from the well-bred steer contains more fat and more energy than that from the scrub steer, although the difference was hardly as much as the results with the calorimeter would seem to indicate.

To sum up, then, I think that our experiments, so far as we can accept these two animals as typical, show this: That the advantage of the well-bred steer over the scrub as a beef producer does not lie in any greater digestive capacity, but that there may be a significant difference in the economy of the physiological processes by which the digested food is converted into meat, a difference which becomes less marked as the animals approach maturity. A second important difference may be in the maintenance requirement. The scrub steer was a nervous, restless animal and both common experience and scientific experiments show that nothing eats up feed like restlessness and that the nervous animal will make less gain out of the same feed than the quiet animal. I think that this matter of temperament is a very important element in the difference between the good and the poor beef animals. Our results also indicate, at least, that another advantage of the typical beef animal is his capacity to consume feed. A manufacturer wants the machine which is able to work up the most raw material, and similarly the farmer or beef producer wants the animal which will consume the largest amount of his feed provided it yields a normal return for it. Finally, and I state this with some reserve, probably a pound of gain by the well bred steer represents a rather larger storage of energy derived from his feed than is the case with the scrub.

The CHAIRMAN: Now, gentlemen, this completes the program for this evening. Is there any questions or business to be brought up before we adjourn?

On motion adjourned at 9.40 P. M. to meet to-morrow, Thursday morning at 9.00 A. M.

Thursday Morning, January 27, 1910, 9.30 A. M.

MR. HERR: You will please come to order. The time is past when we should open and Secretary Critchfield is not well enough to be here this morning. I move that Mr. Rodgers act as Vice-President until some of the vice-presidents arrive.

The motion was seconded and agreed to.

Mr. Rodgers in the Chair.

The CHAIRMAN: Dr. M. E. Conard, the Chairman of the Committee on Dairy and Dairy Products was absent yesterday but is here to-day. We will now call for this report.

DR. CONARD: Mr. Chairman, and Gentlemen of the Board: I am sorry that I was not able to be here yesterday when my report should have been read, but I have a short report and will now present it.

(Note.—Dr. Conard having kept his report for rewriting, it does not appear, as up to the time this Bulletin went to the printer, it had not been returned.)

The CHAIRMAN: You have heard the report. What action do you take on it?

On motion the report was received and filed for publication with the proceedings.

The CHAIRMAN: The next will be the report of the Microscopist and Hygienist, Prof. C. B. Cochran, of West Chester, Pa. Is Prof. Cochran or his report present. Not present.

We come down to the order of the day, Thursday morning's program. The first thing is the report of the committee on Fertilizers, R. F. Schwarz, Chairman, Analomink, Pa.

MR. KLUGH: Mr. Chairman, I believe Mr. Schwarz has passed away within the last month and the Secretary has granted permission to Mr. Christopher G. Atwater to make some remarks to the Board on the uses of Sulphate of Ammonia. He has made this arrangement so that the Board can be more enlightened as to the uses of this product.

Mr. Atwater's address is as follows:

SULPHATE OF AMMONIA.

By C. G. ATWATER.

When the subject of fertilizers is brought up before a meeting of agriculturists, in Pennsylvania, it seems to me that some reference to sulphate of ammonia is in order. Sulphate of ammonia is produced from bituminous coal, in making it into coke in the by-product coke oven, and the State of Pennsylvania leads all the other states of the Union both in resources of coking coal, in the production of bituminous coal and the making of coke.

Sulphate of ammonia is important in agriculture because of the nitrogen it contains. This amounts to 20.5 per cent. by weight. Before an audience of farmers there is no need of my dwelling on the value of the nitrogen. It is the scantiest in supply and the most expensive of the three principal plant foods. It is also the one most easily lost by exposure to the elements or exhausted by heavy cropping. A pound of nitrogen costs on the market three times as much as a pound of phosphoric acid or of potash. The agriculture of a country may fairly be said to depend on its resources of available nitrogen, because it is usually the first to fail, its lack being the usual reason for scanty crops. We have long ago exhausted the original fertility of our virgin soils, in this State at least, and the supply of nitrogen from the waste products of the stock yards and kindred sources is now exceeded by the demand, so that the price has risen steadily. Yet the demand goes on increasing.

There is, however, one source of combined nitrogen that we have hardly touched, namely, that in our bituminous coal. I will try to indicate to you how great this is. Pennsylvania mined in 1907 about 150,000,000 tons of bituminous and semi-bituminous coal. This coal could have been made to yield 3,000,000,000 pounds of sulphate of ammonia. Actually there was perhaps four times as much in the coal as this, but this is the amount that may be reckoned as readily recoverable from a practical manufacturing standpoint. Now, there are about 13,000,000 acres of improved farm land in the State, and if this coal had been treated for its by-products and the sulphate of ammonia distributed equally, each acre would have received 230 pounds. This is a heavier application than almost any one except the market gardeners think of making, and is the equivalent of 47 pounds of nitrogen, as much as would be obtained in one and a third tons of the ordinary 2-8-2 mixed fertilizer. What such an application would have done for the crops of the State you can imagine as well as myself, and this application would not be for one year, but for each and every year. We may state it in another way: A four-foot seam of coal is about as thin as our miners think it pays to work. An acre of this seam will yield about 4,800 tons of coal, from which the by-product coke oven or the coal gas retort will recover enough sulphate of ammonia to put 150 pounds on the acre of land every year for 644 years.

In the light of these figures, I think you will agree with me when I state, that the coal mines of the State of Pennsylvania represent one of her greatest potential sources of fertility, and that it is high time they were being called upon to put this fertility at the disposal of the farmer instead of wasting nearly all of it as is now done. The method by which this ammonia may be recovered consists in making the coal into coke, and this must be done in the coal gas retort or in the by-product coke oven instead of the wasteful bee-hive coke oven now generally employed. It would not be possible, of course, to make all the coal mined in Pennsylvania into coke as much of it is burned as fuel or shipped out of the State, although it is a fact that a smokeless coke is a better fuel for most purposes than a smoke-producing bituminous coal. But of the 150,000,000 tons of bituminous coal mined in 1907, 40,000,000, or over a quarter, were made into coke. The ammonia recoverable from this amount would still be important and could fairly be claimed by the agriculture of the State as its due.

It would amount to 400,000 tons of sulphate of ammonia. In order to judge whether such a large amount may be considered as practically recoverable we have only to glance at Germany and England. Pennsylvania produced about 26,000,000 tons of coke last year. Germany produced 21,000,000 tons. Yet Germany recovered from her coke ovens the equivalent of 340,000 tons of sulphate of ammonia; whereas, the recovery from Pennsylvania's larger coke product was hardly a tenth as much. England with a larger coke production than Germany produced 348,000 tons. Germany consumes nearly all of her sulphate of ammonia on her own fields; while England consumed some 87,000 tons, (her area being too limited for extensive agriculture,) and exports the balance to the various countries of the world. Last year the United States imported 40,000 tons of sulphate of ammonia which they might as well have recovered from Pennsylvania coal instead of letting it go to waste.

Now, it may be asked, why does not someone save this ammonia if it is so profitable and necessary? The answer to this is, that there are now 1,300 by-product ovens in the State, and their number is increasing. But the iron and steel manufacturers say, "Our business is to make coke and pig iron. We do not know anything about this chemical business. If we all build by-product coke ovens the market will be over-supplied with sulphate of ammonia and it will not be worth anything. The farmer does not want it anyway." And meanwhile the farmer says nothing. The matter has never been brought to his attention.

Therefore, I wish to say to you, examine the facts and figures as I have given them to you. Convince yourself that they are correct and then raise your voices in protest. Let it be known that the farmers can use sulphate of ammonia in their business and that they are willing to use it if it is supplied at a fair price, and there is little doubt that the supply will be forthcoming.

I shall be here after the session and shall be glad to answer any question you might like to ask. It is not proper for me to occupy any more time.

MR. HERR: I would like to ask how that sulphate of ammonia is obtained?

MR. ATWATER: By the distillation of the coal. That is to say, the coal must be heated in the closed retort. That is done in the by-product coke oven or coal gas retort. The bee-hive coke oven, in which eight-tenths of the coke made is now produced, wastes all that nitrogen. You have to heat the coal in the exclusion of air and recover the ammonia from the gases. As I said, there are 1,300 by-product coke ovens in the State and they recover a large amount of ammonia but it is only a small portion of what they ought to recover.

MR. CREASY: It seems to me that this is a very important subject, this question of ammonia with nitrogen. As I understand, this sulphate of ammonia when applied to land it makes the land sour and that can be corrected with lime, so that sulphate of ammonia ought to be sold cheaper to the farmer than nitrate of soda, that is, the same amount of nitrogen. The fact that this is going to waste in Pennsylvania and that the farmer is now being investigated in

regard to the prices that he is getting for his products, it seems to me to be well that we would better get after this thing in a way to compel these people to save that sulphate of ammonia. By having that large amount of sulphate of ammonia it would certainly reduce the cost of nitrogen to the farmer one-half. As I understand the laws of Germany, they compel the manufacturers of coke to keep that sulphate of ammonia, and I think they do in some other foreign countries. The thing that I think Pennsylvania ought to do, is to compel these people to not let that product go to waste. The smoke of these coke ovens ruins the surrounding land, thousand acres cannot produce anything. That course would save this oven product and save the land and allow the product to be sold to the farmer at one-half the price and he could afford to use some lime with it. Whether this process is covered by a special patent or not I do not know, but I think if Germany has done it Pennsylvania can do it. I think the Legislature should pass a law compelling these people to save that product. I think this is an important thing when we are being investigated.

MR. STOUT: Mr. Chairman, it would seem if these people realize this fact and that money can be made out of it, why is it not done? Possibly because it does not pay them. Is that the idea.

MR. HERR: I want to inquire something about the cost of sulphate of ammonia produced in that way. Whether it is an expensive process or, if so valuable and so great a quantity of it, why the coal men don't make large quantities of it?

MR. ATWATER: Mr. President, I was only waiting to answer the inquiries until the gentlemen got through so I could answer them altogether.

In the first place, the gentleman's suggestion about sulphate of ammonia and lime is perfectly correct. Sulphate of ammonia and sulphate of potash exhausts the lime in the soil and the proper method is to add sufficient lime to counteract the sulphate. It is cheap enough to allow for that addition. No one in this State attempts to cultivate without liming; at least our experiment station men tell us we ought not to do that.

Now the next point I think was in regard to the production in Germany. They don't compel the coke manufacturers there to make sulphate. They compel them to stop making smoke. They don't all make sulphate but they have gone on adding to the production of sulphate every year, about 50,000 tons for the past six years, and the country still measures up to that production with the consumption just a little bit behind. Germany is a remarkable country agriculturally. They produce 30 bushels of wheat per acre; we produce 12.

Now, in regard to the question about the patents. There is no reason why it should not be done in this country.

In regard to this gentleman's question about the cost, it is being produced right along. It takes lots of capital to do it, but it is coming right along; but, as has been said, it is an important question and that question has not yet been raised. There is not much known about it. It is on the market at a lower price than that of soda in large quantities.

MR. HERR: I don't know that that answers the question about the price.

MR. ATWATER: It is about $2.00 per ton now and nitrate of soda is a little higher, $4.00 and in equivalent. Sulphate of ammonia contains one-fifth nitrogen and nitrate of soda about one-sixth; so that the relative price is to be considered, and when you are buying on the basis of nitrogen the sulphate of ammonia is the cheaper of the two.

MR. HERR: If we know the relative value of each to the soil we could soon figure that, whether cheaper or dearer.

MR. ATWATER: It comes very close to being nitrate of soda.

MR. HERR: Is it as readily available as nitrate of soda?

MR. ATWATER: Almost as readily; the addition is four or five days. The ammonia is in a form that requires a little time for chemical action. Nitrate of soda is already in available form, therefore it ought to show its effects in a day or so. Sulphate of ammonia requires six or eight days for nitrification and once started goes right along and the nourishment is more even. There are certain advantages there.

MR. FENSTERMAKER: In order to reach these coke manufacturers and prevent them from ruining the surrounding country, agriculturally, we should pass a law to prohibit any of their smoke nuisance. They must change their process and make sulphate of ammonia, eliminating the smoke that does the harm; is that the idea?

MR. ATWATER: I did not suggest that. It is one of the ways it could be done. I did not go as far as that. That is what Germany has done.

The CHAIRMAN: I see that a Vice President has come into the room and I surrender the temporary position I have held to one of the Vice Presidents.

S. S. Blyholder, Third Vice-President takes the Chair.

The CHAIRMAN: I am sorry that we were not able to be here on time, but we were busy on committee work.

The Report of the Committee on Livestock, I believe, is next. Mr. M. P. Shoemaker, Chairman, Greensburg, Pa.

Mr. Shoemaker then presented his report, which is as follows:

REPORT OF THE COMMITTEE ON LIVESTOCK.

By M. P. SHOEMAKER, *Chairman, Greensburg, Pa.*

The Livestock industry of Pennsylvania is not only of interest to the producer but to the consumer as well. The report of the United States Department of Agriculture shows a very great increase in the value of farm animals during the past few years. This is also true in Pennsylvania. Never before in the history of the State has there been a greater demand for draft horses for city use, mules for the mines, dairy cows and the meat-producing animals to supply cream, butter and meat for our tables.

The Agricultural Report for 1908 shows number, average price and value of horses, and mules on farms in Pennsylvania, to be as follows:

Horses, 619,000; average price, $116; value, $71,804,000.
Mules, 43,000; average price, $128; value, $5,504,000.

It is impossible to estimate the number of horses shipped into Pennsylvania annually. Philadelphia, alone, requires about 7,000; other large cities in proportion. Most of the imported horses come from west of the Missouri river. They are bought and shipped to Indiana and Illinois; fattened, resold and shipped to the Eastern states.

Many of you, no doubt, remember the map of Pennsylvania exhibited by the Livestock Sanitary Board, at our meeting last January, showing the number of pure-bred and grade stallions in each county. According to the map, we find 664 pure-bred and 1,303 grade sires—two grades to one pure-bred.

The following counties have a larger number of pure-bred than grade stallions:

	Pure-bred.	Grades.
Allegheny,	18	10
Crawford,	58	50
Greene,	22	18
Lawrence,	31	14
Mercer,	49	22
Montgomery,	9	7
Philadelphia,	7	6
Washington,	33	25
Westmoreland,	43	27
Making a total,	270	179

These nine counties, with the exception of two, are in the western end of the State. It seems as though the horse breeding industry was moving west.

Is it any wonder Pennsylvania is a great horse-importing State? With the exception of a few counties, most of the horses come from other states and this, too, in territory which is naturally adapted to the production of the highest type of horses, with a good market at hand. The Western farmer sees the importance of using a pure-bred sire on their native mares and keeps on breeding in the same line.

Your Committee would recommend to the farmers of Pennsylvania that they grow more horses and better horses, that they breed their native mares to pure-bred sires and the offspring to a sire of the same breed. Let one be a Percheron community, others Clyde or Shire. Buyers will soon learn that by going to a certain locality they will have a greater number to select from, and of a more uniform type. All grade stallions are not inferior breeders, but many of them are. They not only do harm in getting inferior animals, but they drive the good horse out of business by their low service fee. Under the present law every breeder can know whether he is breeding to a grade or pure-bred sire, and this knowledge should enable him to discriminate to his own advantage, and the betterment of the horses of this State. Why are we content to produce cheap horses when, with the same feed and care, we can produce good ones, which will sell for larger prices and give the breeder greater satisfaction.

Some reasons why Pennsylvania farmers should breed more horses:

1. They are acclimated and ready for work.
2. They will bring higher prices on the market.
3. They will pay for feed consumed after two years old by work done on farm.
4. You can make money at it.
5. Keep up the fertility of the farms.

The Agricultural Report of the United States for the year 1908 shows the number of milch cows in Pennsylvania to be 1,152,000, valued at $42,624,000, other cattle 965,000, valued at $17,852,000. Large as these figures may seem, Pennsylvania imports annually, chiefly from New York and Ohio, about 20,000 at a cost of about $900,000, a part at least of which might be had by Pennsylvania farmers. Very few of our dairy farmers are growing enough animals to fill vacancies in and increase the size of their herd. They should rear the offspring from their best cows. The average cow in Pennsylvania yields less than 150 pounds of butter per year, not enough to pay for feed consumed, and these are the kind you find for sale, while a calf from the best cow, reared on the farm will be accustomed to the surroundings and treatment, and when she grows to be a cow, will do her best.

In all branches of livestock industry in Pennsylvania, the general purpose idea is too prevalent. It has been demonstrated time and again that you cannot have beef and milk nor speed and heavy draft in the same animal. A very striking illustration of this is shown by the lectures given on the special dairy train in Indiana last December. The lectures were systematized and condensed by the use of valuable charts. A most striking illustration was used to show the value of a pure-bred dairy sire. The records of three animals in a farmer's herd were tabulated on a chart. One record gave the production of a grade cow. This record amounted to 3,085 pounds of milk and 137 pounds of butter for the year. Selling butter for 25

cents per pound, the income amounted to $34.19. The next record gave the production of a daughter of this cow that was sired by a pure bred Jersey bull. This cow produced 6,000 pounds of milk and 280 pounds of butter in one year, making an income of $70. The third record gave the products of another daughter sired by a pure-bred Shorthorn bull. This animal made a yearly production of 3,700 pounds of milk and 155 pounds of butter, giving an income of $38.85. Comparing the records of the daughters with the record of their dam, it was shown that the half-blood Jersey made an increase of 143 pounds of butter over her dam and an increased income of $35.81. The increase made by the half-blood Shorthorn over the dam was 19 pounds of butter or an increased income of $4.66. Assuming that a Shorthorn bull is used in a herd of ten cows and the heifers from these cows do as well as the half-blood mentioned, the increased income per year would be $46.60. If a Jersey sire were used in a similar herd, the increased income would amount to $358.10.

This illustration shows very strongly the importance of using a pure-bred dairy sire. The result would have been as marked had they bred along beef instead of dairy lines. The average farmer in Pennsylvania can, with very little expense, improve his native herd by using a pure-bred sire of either beef or dairy type.

There are on Pennsylvania farms 1,135,000 sheep valued at $5,108-000.00, 990,000 swine valued at $8,415,000.00, yet our State does not produce enough livestock for the requirements of its population. At Pittsburg yards alone the number sold for consumption in 1909 were, cattle, 114,006; swine, 663,925; calves, 86,651; Sheep, 369,801. They report that receipts of all livestock were unsusually light and the average year will enlarge the figures on cattle, sheep and calves 25 per cent., and on swine probably 40 per cent.

Aside from all this, there are annually brought into this State, thousands of dressed carcasses, as well as large quantities of manufactured products and cured meats. It would be impossible, at least at present, for Pennsylvania to supply the demands of livestock products; but, I believe, we are able to increase the numbers and the quality of our livestock, and by so doing, we will be rewarded financially. The farmer who breeds good stock is a public benefactor. As he wields his influence for good, his stock will be an incentive for others to follow in his footsteps. Thus the work moves on and the world is better for his having lived in it.

The CHAIRMAN: You have heard the report. What shall be done with it?

On motion it was received and filed for publication with the proceedings.

The CHAIRMAN: The next is the Report of the Ornithologist, Prof. H. A. Surface. Is he present? He does not appear to be, so we will pass on to the next number on the program, the discussion of the reports presented. Is there any discussion?

MR. DURNALL: Mr. Chairman, upon that subject of the breeding of our animals, I would like to ask a question as to breeding control. I was unfortunate in losing a thoroughbred sire. It was just the time of the year when I had to have one in order that my cows might

have a sire among them. I had no choice. Consequently, I purchased a sire of unknown breeding. From 25 cows I received 14 heifer calves, but I did not wish to raise them because of the sire. During the next year and prior to the time for service I purchased a thoroughbred Jersey bull that was up to my mind. I had 7 choice cows in the herd that I wished to raise heifer calves from. At the time of calving I had them to come in close together that I might raise them together. From the 7 cows I had one heifer calf. I would like to know as to whether in the great experience of any one present they have been able in a measure to control the sex of the progeny from a desirable sire.

The CHAIRMAN: Dr. Conard is called for to answer that question.

DR. CONARD: Mr. Chairman, I always have a profound respect for the last speaker's intelligence and I think he must have a profound respect for the intelligence of this audience to put such a question as that to it. I think he has opened up a channel now that would take the rest of the sessions of this meeting to discuss and then probably we would not have it quite settled. So far as I know, there is no way by which sex can be controlled, so far as I have learned. There have been theories produced. I think the poultry people claim that they get a greater percentage of pullets by crossing the young and old.

MR. WITTMAN: I do not agree with that, mating old and young together.

DR. CONARD: Mr. Wittman says he don't agree with them. So another theory is advanced that if the animal at the time or period for mating has to wait or go long distance to get to the male it would have a tendency to males and the next generation would probably have a superabundance of males. They are all theories and we do not know anything about it.

I might say with regard to this report that I was much pleased with it. I did not catch quite all of it but the part that bore on the number of horses. I think that we are away behind our opportunities in the production of our horses for Pennsylvania. We are buying our horses now very largely from people whose land is worth more than ours per acre; whose land is no more better adapted for the raising of horses than ours. Simply because their fathers and grandfathers were in the horse business and they were bred and born in it and know how to do it, they continue to raise horses in the West and send them here for us to buy for—I don't know what you might call it,—but prices pretty near what we paid for our Christmas turkeys. A horse that weighs 1,200 pounds sells for $200.00, and he is liable to sell for more, but at that rate he sells for 16 2-3 cents a pound. Now, a pound of flesh is a pound of flesh and the question is, which is the cheapest to produce, a pound of horse-flesh or a pound of some other kind of flesh? Can we produce enough pounds of beef-bearing or meat animals or poultry or produce to pay for this pound of flesh that we buy in the horse for less than the horse-flesh costs is the question? I was through Perry county last winter and I had a very good opportunity to meet a good many people who were feeding horses and also a good many cattle raisers. They were buying yearlings and feeding up to three years old and selling them.

I made a little of a study so far as I went to know which place was the cheapest, which place the pound of flesh could be put on the cheapest, on the growing horse or on the fattened bullock, and I found about just as many advocates for the one as the other. As far as I can tell, it was just as cheap, if a man's place was adapted to it and he was adapted to it, to put a pound of flesh on the horse as on the bullock and he gets three times as much for it. I don't think that we should all go to raising horses by any means, but I think those who have suitable farms and are adapted to it ourselves should produce the horses for Pennsylvania. I believe it is an outlay of money that we are not warranted in going on with, this thing of buying horses for farm work for $300.00. We can produce them as well as anyone else. We are provided with the livestock law which makes it possible for every man to know what he is doing when breeding for colts if he takes advantage of that law. That eliminates a great deal of risk. It used to be so that breeding was a lottery, and so it was. The selection of the sire made it a lottery. We can eliminate that to a very great extent by breeding the right kind of mares to the right kind of sires. This is a matter that the people are getting up to and is something to give a little more time and thought to.

MR. WITTMAN: I want to say that he have no positive knowledge to enable us to control sex in poultry. What you want to do if you want to raise pullets is to find a hen whose offspring are mostly pullets and then breed from her and you will get a preponderance of pullets. We can have two generations in one year and you can take any sort of a male and she will throw pretty nearly all pullets. I had one that threw but one cockerel in the three years I had her. I did not try to foster that breed. The poultry people have the advantage. They can work it out more quickly than with the horse, the cow or pig.

MR. SEXTON: In the matter of controlling sex, certainly it would be a wonderful thing if we can do it. It was my good fortune a number of years ago to have charge of a herd of pure-bred Holsteins that was imported from Holland. At that time the calves were worth a great deal of money, and especially the heifer calves and we did like a preponderance of heifer calves if possible. I myself, with one or two others, tried to study up a theory at least that would control the sex, and heifer calves were wanted. It was the heifer calf for which a wonderful amount was being paid, running from $100 to $150 for a calf two, three or four weeks old. But in spite of all theory, all we could do, the preponderance was bull calves all the time.

MR. DURNALL: Might I make a suggestion along the line of thought I had? The reason I asked the question was because I would like to see if there are those who may have had the same experience. The first sire I was compelled to buy was an animal that was considerably run down in condition and therefore his vigor was considerably devitalized and it therefore followed that there was a preponderance of heifer calves; while the cows were in good condition as I try always to keep them vigorous and healthy. The following year when the Jersey sire was used he was in a vigorous condition.

I do not know about that of the cows, though I think about the same, and a preponderance of the male sex followed in his case. It is a question whether the condition of vigor might have had some influence.

MR. HOWARD: I have been a breeder of thoroughbred Jerseys for years and always keep the cows until pretty well up in years. Some cows breed nearly all heifer calves and some nearly all males, has been by experience, in my herd. I do not know whether there have been any that have been raising twins or not, but I have had one cow that had three pairs of twins in three successive years; while I had another to have two pair and the heifer from that cow had one pair of twins. I do not know what is the cause, whether it has been the long continued breeding and care of the stock that causes them to raise twins or what. This has been my experience for a number of years in breeding, that there are certain cows that will have very nearly all heifer calves and some of the best cows may have most males. I have had that experience.

DEPUTY SECRETARY MARTIN: For the information of the members of the Board, I wish to state that the Secretary has a letter from Mr. Cox, of Blair county, whose name appears on the program, that on account of summons to court he will be prevented from attending this meeting of the Board. I make this announcement, explaining the reason for Mr. Cox's absence at this time.

The CHAIRMAN: The Secretary will read the communication, or rather an announcement.

The following announcement was then read by Deputy Secretary Martin:

"At the joint meeting of the State Livestock Breeders Association and the State Dairy Union, to be held at the University of Pennsylvania, Philadelphia, Pa., next week, the Wednesday evening session will convene in Houston Hall and will be devoted to memorial services for the late Dr. Leonard Pearson, Dean of the Veterinary Department of the University of Pennsylvania and State Veterinarian."

The CHAIRMAN: The next on the program is the Report of the Legislative Committee, H. G. McGowan, Chairman.

Mr. McGowan then read his report which is as follows:

REPORT OF THE COMMITTEE ON LEGISLATION.

By H. G. McGOWAN, *Chairman.*

Your Committee on Legislation, through this report, will endeavor to carry out the spirit of legislative demands of the State Board of Agriculture, rather than be responsible for its own formulated ideas concerning new legislation. However, there are some points along legislative lines that might be suggested, but your Committee in particular would emphasize those demands for legislation suggested by the present State Board of Agriculture, in preference to what we might hereafter particularize.

Since our last annual report, another session of the legislature has passed into history, and we are sorry to say that a very small per cent. of the requests made upon that legislature passed into law. For what we did get we feel grateful to those who lent their assistance; but we felt then and do now, that we asked for nothing but what was fair, just and equitable under the circumstances. We felt particularly sorry that the appropriations for local rural roads fared as badly as they did. It was a fair bill, but it was amended and mangled until we got nothing but the corpse. The same is true of other bills.

To the recommendations we will make herewith in the form of suggestive resolutions, we invite the thoughtful consideration of every member of the Board.

TAXATION.

WHEREAS, By the last available report of the Auditor General, the inequalities of taxation in Pennsylvania are plainly shown by the following *astounding* figures:—

"The aggregate appraised value of real estate in Pennsylvania is $4,172,955,443.00.

The taxes paid by real estate is $69,881,707.00.

Average rate of taxation on real estate, 16 mills.

Appraised value of personal and corporate property, $6,511,485,-670.00.

Taxes paid on personal and corporate property, after deducting commissions, licenses and other miscellaneous sources of income, leaves a tax on personal and corporate property of only $19,824,-964.00.

Average rate of taxation on personal and corporate property, 3 mills:"

RESOLVED, That the real estate owners of Pennsylvania demand a *just equalization of taxation in this State:*

RESOLVED, That, inasmuch, as, by the action of the last Legislature, there now exists a Commission for the Codifying of our Tax Laws, this body demands that the real estate owners and organized farmers of Pennsylvania be given hearings before this Commission, and that this Commission be urged to weigh carefully the recommendations of these real estate representatives.

WHEREAS, We believe that a great help toward the equalization of taxation is found in the proposition of having the State pay the minimum salary of school teachers for the minimum school term; be it

RESOLVED, That we urge the recommendation of such law by the Tax Commission and its passage by the next Legislature.

We would present the following as a part of our report, and urge the adoption of the recommendations contained therein:—

If personal and corporate property were taxed at the same average mill rate that real estate would be taxed, personal and corporate property would be required to pay $43,696,483.00 instead of $19,824,-964.00.

Crediting to personal and corporate property commissions, licenses and other miscellaneous sources of income, amounting to $11,000,-000.00 would make a total of $54,696,485.00 as the share of personal property.

If taxes were collected equitably, real estate would be required to pay $35,052,825.00 instead of $69,881,707.00, or a saving to the real estate owners annually of $34,828,882.00.

The real estate owners are, annually, grossly robbed of $34,828-882.00. Fifteen millions of this amount is directly extorted from the farmers and nineteen million from residents and towns, whether they be owners or tenants. It is this policy of the State that has driven away from the farms and rural communities, according to the last census report, over one hundred thousand people from twenty-two counties of the State.

To correct these discriminations against the farm and home owners of Pennsylvania, we respectfully insist that the State either assume a larger proportion of the cost of the local government, or give the local governments authority to tax personal and corporate property in each unit of government.

The State could, without any detriment to its own finances, remit to the counties the $9,716,700.00 now collected by the State from the counties. And in all justice, the State should pay the minimum wages of public school teachers, for the minimum term, which would assist the local governments upwards of $13,000,000.00. And could further relieve the local governments by appropriating a minimum sum per mile to the counties and townships for road purposes equal to fifty per cent. of the road taxes paid each township; limiting the amount to $20.00 per mile, and relieve the counties and townships of the partnership business in constructing State roads. Let the State assume with the aid of the National Government the entire construction of inter-state and inter-county roads.

If there are not sufficient revenues for the State Government, an additional tax of one mill could be placed on all personal and corporate property (without any hardships) with a small tax on the gross productions of mines, oil and gas wells, and similar enterprises.

Besides, there are numerous other sources from which revenues might be derived.

If the State treated the agricultural class with justice and equity the farmers would be contented in their vocation, and Pennsylvania would have more prosperous and happy agricultural communities, which are the mainstay of the prosperity of our Commonwealth.

GOOD CANDIDATES WANTED.

WHEREAS, In scanning the *personnel* of our Legislature there is no trouble whatever in picking out the farmers and those in sympathy with the farmer and his industry and counting them upon our fingers; and

WHEREAS, Recent history has taught us that the long promises of the candidates who truckle for the farmers' votes fall short in fulfillment; be it

RESOLVED, That we urge all farmers to get out to the primaries and vote for the candidates for legislative and executive offices, upon all party tickets, whom we know will stand for our propositions; and

RESOLVED, That we do not scatter our ammunition, but urge the farmers in every county to center upon certain men in all parties and see that they are nominated.

INITIATIVE AND REFERENDUM.

We would especially urge careful and thoughtful attention to the following preamble and resolution:

WHEREAS, We believe that misrepresentation will continue and unrepresentative laws be passed just so long as our representatives have no more to fear than defeat at the poles, and this made remote by corrupt election methods;

RESOLVED, That we advocate an amendment to the State Constitution which will give us the initiative and referendum in a workable form; and

RESOLVED, That we urge all candidates for the Legislature to pledge their constituents to work for the submission of this proposition to the people, if elected.

STATE FAIR.

We believe that our farmers are much interested in the passage of a law providing for a State Agricultural Fair. Too much cannot be done by our Legislative body for the promotion of agriculture, either by the appropriation of money or by the passage of new and effective laws.

We would speak with praise of the law passed by the session of 1907 appropriating $1,000 to each county holding an agricultural fair. We believe this has greatly stimulated agricultural exhibits at our fairs, thereby creating increased interest in agriculture by our farmers receiving just remuneration for their labors.

EXTERMINATION OF WEEDS.

We believe that a general law looking toward the extermination of foul weeds throughout our State is greatly needed. Such a law should make it a misdemeanor for any person to sell grass seed containing the seeds of foul weeds. It also should be made the duty of land owners to prevent certain foul weeds from seeding on their premises and the duty of Supervisors to prevent the seeding of said weeds upon public highways. More vigilance upon the part of the farmers is urged upon this line. Carelessness and untidiness in business brings failure and disappointment, and indifference in allowing the various foul weeds to grow without being checked, reproducing millions of seeds, is a hurtful habit, if not a sin, perpetrated upon the intelligence of the American farmer.

A law should be in vogue compelling seed dealers to label the bags as either strictly pure or as containing a percentage of inferior seeds. Such a law, also, should make pure seeds to be absolutely free from inferior seeds.

THE STATE COLLEGE.

It has been made apparent by recent developments that the School of Agriculture at the Pennsylvania State College is inadequately equipped for the most telling work. A building designed to teach the great work of Horticulture is needed there and we would recommend to the next Legislature that an appropriation for such building be made and that sufficient appropriation for all of the work of the Agricultural School at State College be given the Institution.

OUR STATE DEPARTMENT.

We feel that it is incumbent upon us in this report to recognize the efficient work being done in our State Department of Agriculture. The farmers of Pennsylvania are benefited materially by the work of this Department, and we would urge that all Pennsylvania farmers familiarize themselves with the work being done here and lend all assistance in their power to furthering this work.

Pennsylvania has one of the best oleomargarine laws in the country, and the work of prosecuting the illegal sale of oleomargarine is persistently done by the Department. We would recommend, however, that less care be taken for the raising of revenue through fines and licenses than for the extermination of the traffic in colored oleomargarine. The fraud in oleomargarine is in the coloring of it, and our Pennsylvania State law fully covers this fault.

RESOLVED, For the further stimulation of agraculture, which is the foundation of all our material wealth and prosperity, we would recommend that agricultural societies, instituted for the spreading and development of agriculture, owning their own properties and holding annual fairs, be exempt from the burdens of taxation, as this would greatly assist and relieve much embarrassment.

In conclusion, we would, to the best of our ability, impress upon the farmers of Pennsylvania the necessity for increased vigilance in zealously guarding their profession from the attacks of the outside interests that are parasites upon the productive body.

We believe that the proper position of the agricultural industry cannot be secured until the farmers get together through their own organization and demand the passage of laws that are fair and the election of men to executive positions who are not biased in favor of the interests which prey upon the people who produce.

We believe in improved methods in agriculture and know that the productiveness of our farms should be and must be increased; yet we also feel that it is not by method that the farmer will come into his own as a producer and a real part of our social and business scheme, but by legislation and the proper execution of well meant laws.

We have but the kindliest feeling for the workers in other walks of life, be they bankers, merchants, doctors, lawyers, or what-not, so long as they are fair and inclined not to extort, but we do feel that the farmer should stand on the same plane with other professions and be accorded the same hearing. It is possible for the farmers to have all that belongs to them, and it is their fault if they do not get it.

Respectfully submitted,

(Signed) HOWARD G. McGOWAN,
S. S. BLYHOLDER,
MATTHEW RODGERS,
A. J. KAHLER,
E. B. DORSETT.

The CHAIRMAN: Gentlemen, you have heard the report. What action do you take upon it?

It was moved and seconded that the report be adopted as read.

MR. HERR I was going to say, that I listened to a great many reports of legislative committees before the State Board and I am well satisfied that this is one of the best, if not the best, report received, voicing every sentiment at the present time. Therefore I endorse the motion to adopt the report as a whole.

MR. DURNALL: It seems to me there are quite a number of resolutions there that the mind of the average citizen cannot grasp at one time. Might we not delay a little and consider those various resolutions sometime. We could do it more intelligently I think.

I move to amend the motion, that we consider these resolutions and recommendations seriatim.

The motion to amend was seconded, put and lost.

The original motion to adopt the report as a whole was then put and carried.

The CHAIRMAN: The next thing on the program is, "The Four Essentials of Soil Fertility," by Prof. Alva Agee, of State College.

Prof. Agee then presented the following paper:

FOUR ESSENTIALS OF SOIL FERTILITY.

By PROF. ALVA AGEE, *State College, Pa.*

There are only four essential things to consider in converting all the thin fields, between the Mississippi River and the Atlantic seaboard,into productive land. The first one is drainage. Much of our land has natural drainage and this problem does not enter. Other land is wet-water soaked. We know what that means. Air cannot enter to help make the inert plant food available. Friendly bacteria cannot work for us. Roots will not penetrate into the stagnant soil. We cannot plant in season nor cultivate as we should. The soil is water-sealed when we want it to be active. Such land must have drainage.

Usually we should underdrain and tile is the best material, but each man may solve the problem in his own way. If surface tiles will secure the end, well and good; if a deep-running plow will break up a hardpan that prevents escape of water, that is fine; if stone drains are preferred they can be used; if a profitable crop can be found, which thrives in a rather wet soil, that is another solution to the problem. Most plants want a well drained soil if they are to be grown with profit. Drainage of some sort is essential. It is one of the four considerations when there is unprofitable land to be put into profitable condition.

The second requirement is that the soil be sweet. Very much land is acid. The area grows greater year by year. The acid condition is unfavorable to many kinds and notably so in the the case of the clovers. Low wet land and high sandy land may be sour. Infertile land in the eastern half of this country usually is sour. Do not waste time arguing the point with men whose land does not need

lime. Let them believe as they may; no harm can result because their soil is sweet, but lime your own land if it is acid and do it quickly. This is the second essential and there is no way of getting around an essential.

Probably all land in our Eastern States will become acid some day if no lime is applied. Lime was put into soils when they were made and is its natural tendency to get out of soils. When there is not sufficient lime in available form to combine with the acids that continually are forming in soils, the result is an accumulation of free acid that is harmful to most plant life. While some soils of Pennsylvania had a scant supply of lime in their making and are now so acid that clover refuses to grow, we have large areas of limestone soils that have ceased to be sweet and clover is quitting. An application of lime to keep soils alkaline is essential to profitable crop production.

One year ago it was my privilege to discuss this phase of the soil fertility problem before this body of men, and it is hardly proper that I repeat what was said at that time. The use of lime in a rational way to keep soils sweet is the biggest consideration in the agriculture of this day.

The third consideration in the improvement of soils is organic matter. If there were an abundance of manure on all farms, this factor in soil building would need little consideration. When the manure were rotted in the soil it would improve the texture of the ground, assist in holding moisture, and add plant food. But there is not one-tenth enough manure to keep all the land supplied with organic matter, and dependence must be placed upon plants. We may get the material from their roots and stubble, as is usual in case of the clovers and grasses, or from the entire plant. When the supply of manure is light it pays best to use it to grow heavy sod for plowing down.

We have learned that big returns may be obtained from a very moderate top-dressing of grass and clover fields immediately after hay harvest. The manure doubles its efficiency by making a heavy growth of roots and aftermath to be used for feeding succeeding crops in the rotation. The making, saving and application of manure affect farm incomes greatly and a lot of skill is possible. Organic matter in the soil is the big consideration, and manure can be made to supply as much indirectly as it does directly.

There is a limit to the amount of stable manure that may be made, because there is a limit to the amount of soil products that should be furnished the human race in the form of animal products. Our chief need is better care and use of the manure now made. But there would hardly be a limit to the supply of organic matter for soils from the clovers, if we would meet the conditions for successful clover growing. On two-thirds of the land from the Mississippi River to the seaboard there has been a tendency to accept the idea that the clovers can not be made to grow successfully.

In the Northern States the varieties in common use are medium red, mammoth and alsike. They have been failing more and more and land has grown deficient in organic matter and less productive. There are limited areas in which disease has caused failure, but in the vast majority of cases the inability to grow clover can be overcome. Drained land, made sweet with lime and given proper appli-

cations of fertilizer, can be brought to the production of heavy clover sods. Some doubt the statement, but within the last few years the certainty of it has been established by thousands of men on all kinds of soils. We can get the clover, and it does not pay to doubt the fact.

Medium red clover is a great soil-builder when given a chance. It produces two crops, and we can harvest one of the two without any great injury to the soil. This may be the first crop, the second crop being plowed down. Or, we may clip the first crop twice, making rich mulches, and then take off a crop of seed. When we take both we rob the land of organic matter unless the manure comes back to it. Medium red clover also makes a big growth of roots. When a soil is not water-logged, and has been sweetened with lime, medium red has no superior in ability to build up fertility.

Where drainage is less good, and where there is some defficiency in lime, the alsike is surer. It does not equal medium red or the mammoth as a soil-builder, nor does it make as much hay per acre, but it is excellent nevertheless, and a good plan is to mix alsike and red when seeding doubtful ground. The alsike seed is small, and a mixture of one bushel alsike to five bushels medium red is good.

The mammoth makes only one crop. It makes coarse hay and falls badly when seeded alone. It is a good mixture with timothy, ripening later than the medium red. The latter is the better for fertility if its second crop is left on the ground.

It would be great if crimson clover could be grown throughout the Northern States. It is a winter annual, like wheat. If it were a hardy plant, our Northern States would have the best possible winter cover crop. If people inoculated the soil for it, as they do for alfalfa, the day would come when much larger areas in the North would grow this clover with success.

The grasses can furnish a large amount of organic matter to land, and would be soil-builders if used aright. The chief trouble is that we do not fertilizer grass sods so that they will be heavy, and do not plow them down when heavy. We use them to skin the soil rather than to build it up. A heavy grass sod, turned under with some aftermath, adds largely to the soil's supply of vegetable matter and therefore to productive power. We are learning that it pays better to fertilize a sod than to fertilize the crop following the grass. The investment makes double returns. The aim always should be to give more organic matter to the soil. It is the life-giving factor.

The fourth essential is available plant food. We may have drainage, and sweetness of soil, and a fair amount of organic matter produced by means of the natural strength of the land, and yet lack sufficient fertility for a crop that will give us a maximum of profit in soil building. We often lack the available fertility to produce the needed organic matter. In either case it is necessary to supply the available plant food. Wide experimentation throughout the territory between the Mississippi River and the Atlantic seaboard discloses the nearly universal need of phosphoric acid in our soils. When land has drainage and lime and is not producing satisfactorily, it is a safe assumption in Pennsylvania that phosphoric acid should be applied. When the requirement for this element has not been fully met the results from applications of nitrogen and potash are sadly limited. A pretty good rule is to meet the requirements of the soil for phos-

phoric acid in a liberal fashion and then to inquire further into the soil's needs. Where organic matter is used in liberal amount and thoroughly good tillage is given, we may find that phosphoric acid alone will insure quite satisfactory returns from the land. It is the rule, however, that when the soil requirement for phosphoric acid has been met, applications of potash begin to pay and applications of nitrogen are wholly profitable, even at the present high price of nitrogen, unless stable manure or heavy clover sods are freely used. It is poor policy to put labor and seed upon land that is left deffi-cient in available plant food. If we have reason to believe that there is not a sufficient amount of nitrogen to produce a heavy leaf growth of dark color, it is good business to buy the nitrogen in a commercial fertilizer if the crop is to be planted. The grower of staple crops will plant to secure larger supplies of nitrogen in the immediate future through the use of legumes and stable manure, but he will not get away from the use of phosphoric acid and possibly of potash, and as the years go by the application of these mineral elements will become greater.

I have sought to present in a simple way the four principal considerations that present themselves to an experienced man who looks over a thin soil that he wishes to put into productive condition. He thinks first of drainage; next, destruction of harmful acids through the rational use of lime; thirdly, rotting organic matter that is the life of any soil, freeing natural strength and making land retentive of moisture; and lastly, the application of immediately available plant food, both to produce organic matter and to supplement the natural forces in the worn soil. The man who centres his attention upon these four considerations and meets the requirements in a practical way can hardly fail to solve his problem.

The CHAIRMAN: What action do you take on this paper?

On motion it was received and filed for pnblication with the proceedings.

The CHAIRMAN: Is there any discussion?

A Member: We have a lot of sandy soil. We can lay ground limstone down, pulverized, at $2.00 per ton. We can get the ground burned lime for $5.50 per ton, and we can put the stone lime there for $3.50 per ton. How much should we use and which would be the cheaper?

PROF. AGEE: I think we may safely consider one ton of pulverized limestone worth as much in correcting soil acidity as one-half ton of lime, provided the limestone is absolutely fine. I would not care to recommend the use of pulverized limestone that would not go through a 60-mesh screen nnless that limestone could be purchased at a very low price. Effectiveness is determined largely by fineness. If I could get pulverized limestone as fine as flour, delivered at the farm for $2.00 while lime would cost me, in good physical condition for application, $5.50, I should take the pulverized limestone. I should value the material by the percentage it contains of the base that corrects the acidity of the soil. Now, the stone lime, unslacked, at $3.50, probably presents to you more material for correcting the acidity than the pulverized limestone at $2.00, but the physical con-

dition is wrong. You must slack the lime before you can use it, and there is some difficulty in the even distribution of slacked lime when the quantity is near 2,000 pounds per acre. So I should prefer pulverized limestone always with the provision that it is as fine as flour or nearly so.

As to the matter of quantity, if we knew how much free acid there is in any acre of land, we would know just how much lime is needed there to give an alkaline condition. We do not know. I would try out 1,000 pounds per acre and see what happens, and it has happened on these acid farms nearly every time that a fair amount of clover has come in. At the Ohio Experiment Station a thousand pounds of lime did not prove to be sufficient. It gave a fair amount of clover on land that had not been producing clover in the lifetime of the Station, but it did not give a big clover set, and in rotation, five years later, clover was sowed without lime being used and the condition was nearly as bad as the five years previous.

We have some land in this State that needs a ton. Our soil expert tested some soil in Northwestern Pennsylvania and he estimated that it would take eight tons of lime to put that particular spot into good condition. But this is not true of all the section, because I have friends in that section that have been using lime in the last three years and are getting quite good clover with a thousand pounds per acre.

A Member: You consider about 2,000 pounds of the limestone necessary?

PROF. AGEE: I just guess at it. When you burn your lime, 44 pounds goes into the air. It is the 56 pounds that have value. So we say 50 per cent. We double the amount in case of limestone and find then we must have that limestone very fine to be effective.

PROF. SURFACE: I should like to ask what is the fineness of the pulverized limestone furnished at the State College Experiment Station?

PROF. AGEE: We have been getting pulverized limestone at the College of various grades. The last limestone that was furnished us doubtless would pass through a 60-mesh screen.

PROF. SURFACE: Had it been sifted?

PROF. AGEE: I am trying to recall whether the test was made. I am comparing it in my own mind with some limestone from another factory in the State that has passed through a 60-mesh screen, but I am not sure at this moment that the lime of which Dean Hunt spoke has gone through a screen of that size. We got that at quite a low price. The amount to be secured is limited. It is only a by-product. Only a relatively small amount of limestone is reduced to that fineness, the other limestone being in demand commercially for manufacturers.

MR. YOUNG: Mr. Chairman, in regard to hydrated lime. We have in our county the manufacture of hydrated lime. It is put up in sacks and sold for $7.00 per ton. What can you say of it?

PROF. AGEE: I can say that hydrated lime is in fine condition physically for distribution. A ton of hydrated lime cannot correct as much soil acidity as a ton of pulverized lime if both materials are made from the same limestone. When your hydrate lime you add weight without adding to the amount of the material that corrects acidity.

MR. YOUNG: How much water is necessary to be added?

PROF. AGEE. We have found that hydrated lime contains some air-slacked material. Our manufacturers are unwilling to guarantee that hydrated lime is pure hydrated lime. Some of the material gets into air-slacked form and in that case more weight is added. To secure good slacking there is an addition of 600 or 700 pounds weight to the ton of stone lime.

MR. YOUNG: Is not there more water in hydrated than in pulverized lime?

PROF. AGEE: The pulverized lime should not have any water in it, but you cannot pulverize lime and ship it around without having some slacking occur. Pulverized lime in use shows by analysis to be partly air-slacked. We cannot get it absolutely pure. Hydrated lime has an additional weight there of 600 or 700 pounds per ton. On the other hand, it is in such a fine physical condition for distribution over the ground that I say to my friends that I would give fully as much for hydrated as lump lime, and I think a bit more, because when you slack the lime you have difficulty in distribution, and are pretty apt to have some waste.

MR. STOUT: In connection with this draining and growing clover, is it advisable to undertake to grow clover on soil necessary to be drained on such clay bottoms as will remain more or less wet after drainage?

PROF. AGEE: I can answer that question in the affirmative, because in my native state much of the drained land is a tenacious clay, which would not have value without drainage, and when drained grows good clover. It was true of my own farm, where I put in miles of drains. My friend, Joseph E. Wing, who has some soil naturally heavy and wet, and who drained by means of about 17 miles of tile, has been able to grow alfalfa, a plant that will not stand wet conditions of the soil as well as red clover. If natural fertility is in the land, it will pay to underdrain. If the land is wet and thin, a man should hesitate. A gentleman wrote me the other day from a western county stating that he had flat stone in the land about two and a half feet below the surface, and the water was held in the ground. The land was too wet for cultivation, and he said the soil was naturally thin. Now, gentlemen, I could not afford to tell him to invest money in that land without more intimate knowledge. If the land is not naturally strong, do not spend $20.00 an acre on it for drainage; but if the land is naturally strong, locked up with water, then I do not hesitate to say drain. If you will not drain, pick out an enemy and give him the land.

MR. SEXTON: How about limestone correcting the acidity of the soil?

PROF AGEE: I have had it demonstrated in the field. Raw limestone made absolutely fine takes up the free acid in the soil and creates an alkaline condition. I have rarely seen better clover than at one sub-station in Ohio, where a formerly sour soil, in a miserable physical condition, was growing red clover after treatment with finely pulverized carbonate of lime. It is one of those demonstrations that a man cannot get away from. He knows the scientists and chemists are telling the truth when he sees these results obtained in the field.

MR. SEXTON: Would it not be cheaper to use the raw limestone altogether?

PROF. AGEE: That is a matter of freight; a matter of purchase price and freight. It seems to me that men who have no source of supply within 100 miles or so could not freight in two tons of material to get one ton of the element which would correct the soil accidity. That is what you are doing when you freight in the raw limestone.

The CHAIRMAN: Anything further on this subject?

MR. HOWARD: I had taken a piece of land as a gift, a good part of it. It had been laid very heavy naturally with limestone, and a part of it was such that you can't hold it down by weight on the handles. It is naturally wet land. I have done a great deal of draining, and this piece of land will grow any kind of crop, and in a dry season you are sure of a crop whether any any rain or not, on this land. When you get on the bottoms around, the corn burns up, while on that land there is no checking the growth. In a wet season when not drained enough, that land will not produce as well. This shows it is not drained enough. It is the very best land after being thoroughly drained, but it costs a great deal to do it. Stone draining is what I did. We have the stone handy. We had piled them up but we are putting them underneath. The land cost practically nothing in the first place, but now we grow a good crop any season, unless it is very wet, and the clover, of course, catches. I lime every year. I continue to lime every year. I put on about 80 bushels per acre. Of course, there was nothing on the farm when I got it. It grew nothing. You would have to go to the woods to make a living. But instead of selling the stuff off the farm, if I did not feed it, I plow it under. It is a good way to invest your money and keep it there. That has been my experience in underdraining the farm. There used to be in times gone that lime would dry it; but unless it is wet, with lime that is the end of it. So that draining is the secret of success.

The CHAIRMAN: I see Prof. Surface is now present and we will call him to present his report as State Ornithologist.

Prof. Surface then presented the following report:

REPORT OF THE ORNITHOLOGIST.

By PROFESSOR H. A. SURFACE, *Harrisburg, Pa.*

It is the duty of your Ornithologist to give an annual report upon the subject of ornithology and kindred subjects, as seen in this State during the year 1909. It has not been a year marked by any remarkable or unusual features in bird study, but some of the year's bird features are worthy of our attention. In looking over the correspondence of the Economic Zoologist we find some indications of popular thought on the following points:

1. On January 5, 1909, Miss Marian Gunnison, Erie, Pa., desired information concerning the establishment of a branch of the Audubon Society.
2. On March 26, 1909, Miss Mary I. Graves, Susquehanna, Pa., observed a Bird Day in her school, and desired information concerning the establishment of an Audubon Society.
3. On March 29, 1909, Mr. Howard J. Kuntz, Erie, Pa., wrote to us concerning the establishment of a bird club. Mr. John M. Phillips, member of the State Game Commission, of Pittsburg, Pa., was referred to as a good person for Mr. Kuntz to consult. Mr. Phillips offered a prize to everyone who got a bird to nest in a bird box, which he had made for this purpose.
4. Mr. Rodger Harvey, Coudersport, Pa., on May 12, 1909, desired information concerning the economic features of hawks, owls, crows, cowbird. Bird publications were also desired.
5. Mr. B. S. Bowdish, New York City, on July 29, 1909, asked for opinion on reports of birds killed by spraying.
6. Mr. E. M. Handwerk, Germanville, Pa., on June 21, 1909, wrote to us concerning blackbirds and crows pulling corn.
7. Mr. Christian Krier, Bethlehem, Pa., wrote on June 12, 1909, asking that a law be passed changing the present law concerning pro tection of blackbirds because they destroy corn.
8. Mr. H. B. Richardson, Beaver Falls, Pa., on March 13, 1909, sent us a specimen of Morning Dove
9. Mr. William Smith, Hazleton, Pa., wrote concerning English Sparrows as scavengers.
10. Mr. R. W. McDowell, Uniontown, Pa., wrote on January 4, 1909, that he has been successful in colonizing Purple Martins around his premises. He expects to furnish us with an article on the subject, describing his methods.
11 Mr. J Warren Jacobs, Waynesburg, Pa., on April 30, stated that he is making and selling bird houses in different localities.
12. Mr. G. H. Williams, Blossburg, Pa., on February 3, 1909, sent us a specimen of female Pine Grosbeak. He stated that they are quite tame.

In further discussion of these points we wish to report as follows:

First, there is an increasing demand for information in bird study and upon the subject of the formation of Audubon societies and bird clubs, and also the establishment of "Bird Day" in schools. If persons interested in this will write to Mr. Frank E. Chapman, Editor of Bird Lore, American Museum of Natural History, New York City, or to Dr. William Dutcher, 141 Broadway, New York City, or to Dr. Witmer Stone, Academy of Sciences, Philadelphia, they will be able to obtain information of the kind desired. They can learn the purpose and methods of establishing a Bird Day in the schools and of calling the attention of the pupils in the public schools of our State to the ethical and economic features of our native birds. It seems very necessary that the birds be preserved, and that sentiment be created and maintained for their preservation. This can not be done better than in the public school, while the mind is in its formative process.

Concerning reports of birds having been killed by spraying, we must say that we have had considerable correspondence with Dr. E. H. Forbush, Ornithologist of the Massachusetts State Board of Agriculture, on this subject, and he is of the opinion that this does not occur excepting where the caterpillar might be recently loaded by eating poisoned plant tissue, and the poison not having yet taken effect upon the larva or "worm." At such a time there would be at least a chance of its being eaten by a bird, with injurious effects upon the latter. However birds do not eat sickly nor dead insects, and, on the whole, we must surely say that spraying is far more beneficial than injurious in its results, and it is not our opinion that the reduction of our insectivorous birds in numbers is due to any noteworthy extent, whatever, to the modern and commendable practice of spraying with arsenical poisons to destroy chewing insects and prevent fruits from becoming wormy.

Concerning crows and blackbirds pulling corn, we must, unfortunately, report that it has been our own experience to lose a small tract of corn by the ravages of the blackbird and, of course, we are therefore in condition to be personally prejudiced against this species, although careful analysis of the situation shows that most of the corn pulled was infested with cutworms and was probably pulled for the sake of obtaining these insect pests. A remarkable case of this general kind, where the robin was detected in the act of pulling cabbage plants, and was found to be engaged in the work of eating maggots or larvae which infested the roots of the plants, was reported in the Monthly Bulletin of the Division of Zoology, and was also mentioned in a previous report of your Ornithologist. It is interesting to note that in the annals of Economic Ornithology the report of this particular occurrence has become classical, and has been published as a leaflet by the National Association of Audubon societies. It is still an open question whether the blackbird should be destroyed in the cornfield. If they can be driven away and preserved during a short time, it will save the corn and also retain them for future beneficial services, such as we know they do perform.

The remarkable success of the efforts of some persons to colonize the Purple Martins around their premises is one of the features of bird preservation and observation for the year which deserves special mention. Several persons erected bird houses according to plans previously published by the Division of Zoology of the Department of

Agriculture of this State, and reports have reached us to the effect that such efforts have in many cases not been in vain.

We have one very interesting report of the Purple Martin having been driven away by honey bees. This and our reply is as follows:

"R. D. No. 1, Bangor, Pa., January 10, 1910.

Prof. H. A. Surface, Harrisburg, Pa.

Dear Sir: A little over a year ago I built a bird house for the Purple Martins, according to directions in one of your Bulletins, with some 20 rooms in it, and raised it on a pole to the proper height from the ground, and kept it clean from sparrows' nests. In the Spring of 1909 some Martins came and flew around this house at many different times, and even alighted on it to look around, but every time they went away again. Under this house, about fifty feet or so away from it, I have three colonies of Italian bees, and it seems that the bees drove the Martins away, because I and my wife watched several bees flying about the birds, and they seemed to have a fright. We noticed a Martin darting and screaming for several minutes at a time, with the bees right after it. Now the question is this:

(1) Will the bees drive away or prevent the Martins from occupying my house?

(2) Will the Martins eat my bees if I should establish a colony of them?

I don't want to give up the bees, and, also, would like to have the birds. I will feel very much obliged for an answer. Thank you for help in the past.

Yours respectfully,

(Signed) .....

R. No. 1, Bangor, Pa.

(Reply)

January 13, 1910.

My Dear Sir: Replying to your very interesting letter concerning your experience with Martins and bees, I beg to say that it is my opinion that the Martins are very alert when searching for nesting places, and anything that would disturb them, would tend especially at that time to drive them away, as is the case with other birds. While I think the bees would become accustomed to the Martins and not continue to attack them, yet I have no doubt according to your description, that the bees would molest the Martins just at the critical time when the birds were deciding whether or not they should remain there. I do not think the Martins would eat the bees should they become established, and I would offer the suggestion that possible the bird house was in the line of flight of the bees, and thus more readily discovered and attacked.

I would suggest that the hives be turned around so that they will face from the bird house, and possibly be placed back of some shrubbery so that the bees will not see the birds as they come and go. This entire condition is unusual but not impossible; and while I cannot prove it, yet I believe that this interpretation is correct, and that these suggestions will be found practical.

Very truly yours,

(Signed) H. A. SURFACE,

Economic Zoologist."

The Purple Martin is one of the most valuable insectivorous birds, feeding while flying, and not known to have any objectionable features, excepting, possibly, that of littering the ground under its nesting place. We are interested in knowing that one person in this State is conducting an extensive business in manufacturing and selling bird houses, adapted specifically to the needs of this bird, which could be so well protected and induced to colonize around the premises where suitable arrangements are made for it.

The barn swallow is another bird worthy of careful preservation. Many of us remember when at least two species of swallows used to make their nests beneath the eaves of the old farm barn, and were among the most attractive sights on the premises, with their gyrating curves, amusing antics and social twitter. We have seen them perched like musical notes on telegraph and telephone wires, but we have likewise seen their nests destroyed again and again under the erroneous and cruel supposition that they carry pests, such as bedbugs. While this statement is, like many others, in being rumor without sufficient foundation, it has at least the slight basis upon which it can rest, in the fact that these birds may be infested by a kind of tick that somewhat resembles the bedbug. This, however, does not spread to mankind nor to livestock, and, therefore, does not form any basis to justify their destruction.

The quail or "bob white" is becoming more rare, and should be given every reasonable protection. It is one of our most valuable insectivorous birds and seed-eaters, being a beautiful and attractive bird, and of such economic value that the farmer cannot well afford to do without its services. We, of course, recognize the fact that the necessity for the destruction of certain pests, especially insect pests, is annually engaging more and more of our attention and involving greater expense. How often do we forget the services of the seed-eating birds, such as the song sparrows, the quail and the dove. The song sparrow alone renders us a service which is estimated to be not less than tens of thousand of dollars annually in this State, in the destruction of weed seeds, which otherwise would be liable to spring up and become the foe of a cultivated crop.

The closed period (of years) for quail is advocated, and rightly; but it does not seem to meet the needs. What we need is funds in the hands of the Game Commission for the propagation of the quail, and adequate laws for its real protection during vigorous winters. To prevent the hunting of the quail during the fall, but permit them to be snowed under or starved by prolonged covering of ice and snow, such as we see this winter, means the destruction of more quail by the second method than by the gunner. Surely we are more guilty of the crime of omission or neglect than we are of commission, for the reason that it involves the destruction of more of the beneficial creatures about us.

In this regard we must call the attention of the public, especially to the farming people, to a very important subject: the Gun License Law. This is outlined in the October Bulletin of the Division of Zoology of the Pennsylvania State Department of Agriculture. This outline was furnished by the State Game Commission for the purpose of acquainting the public with the provisions of the proposed legislation. Among these are the following:

1. The gunner to pay a license fee (perhaps fifty cents or a dollar) for carrying a gun or hunting, excepting on his own premises.
2. No person under sixteen years of age is permitted to carry or handle a firearm at any time.
3. Unnaturalized foreigners debarred from carrying or using firearms.
4. The gunner get written permission of any land owner before entering upon his premises, although this may be good for any length of time for which the owner may see fit to give it.
5. He must carry his license with him, and be willing to submit it to the owner, lessee, tenant or employee of the owner of the land on which he hunts. This will give his name and address, and make it possible to identify any person guilty of misdemeanor.
6. The owner, tenant, lessee, employee or person employed by the owner is authorized to forcibly arrest at once any person refusing or failing to produce and exhibit his license at their request.
7. The money collected as fees is to be put into a fund for the purpose of game protection and propagation.

The provisions of this law meet the present inadequate laws in making it impossible for one to trespass on another's premises, without the written consent of the owner, and this also obviates keeping the premises posted. We know how difficult it is to keep signs of the exact legal wording, especially where the gunners will see them frequently and will shoot them or destroy them, and the owner cannot watch against their destruction. According to the present law if a poster is not worded exactly correct, saying, "THIS IS PRIVATE PROPERTY," etc., it is not a legal warning for trespassers to keep out. Also, the farmer has no means whatever of learning trespassers' names, and no means of arresting them without a warrant. This makes it very easy for the town hoodlum to run over their premises and engage in killing fowls or robbing fields or orchards of their contents, and if he is observed, he can disappear before his name can be learned or before he can be arrested. The proposed law affects no hardship on the farmer's boy, because he is permitted to hunt on his own premises.

Another feature of the case is, that it will provide a needed fund for game propagation, and will make it possible to protect properly our insectivorous birds, as well as those that are generally called game birds. If game were known to be abundant in any part of the country, there hunters would go in numbers, and would become acquainted with the country people and leave their good money behind, just as persons now go for pleasure or recreation to the watering resorts or other places, and spend considerable money in the quest of recreation.

Under the heading of bird protection, we must not fail to call attention to the warning issued by the Game Commissioner concerning the effects of permitting cats to run wild and half fed, or not fed at all, when they will be almost sure to form the habit of hunting and killing birds, and will prove very destructive. While the cat is a most beneficial creature if properly kept in place and in check, yet we must remember that there are limits of profitable increase, and no person should permit the cats, however beneficial they may be in granaries, storage rooms or barns, to increase in such numbers that, in order to obtain food, they must kill birds, which are of great value and worthy of every effort we can make toward their protection.

To protect birds' eggs and nests from destruction by cats and squirrels, especially little red squirrels, as well as serpents, we recommend placing a band of tin one foot or more in width about each tree in which the birds are observed building their nests in the springtime. If there are two or more trees in a clump whose branches intertwine, it is, of course, necessary to band all of the trees of the clump to prevent squirrels from reaching their nests.

In conclusion, I need but call attention to the increasing ravages of insects, due certainly in a great part to our failure to give proper attention to the protection and propagation of their enemies. However, beyond the economic feature, there is a higher moral or ethical feature of the effect of bird life upon mankind, and we are sure that it is not necessary for us to urge upon such a body of persons as this the great economic and ethical importance of joining hands as completely as possible for the protection of the beneficial and beautiful forms of life about us, which if neglected will so certainly meet their doom through our negligence.

The CHAIRMAN: You have heard the report. What action will you take on it?

On motion it was received and filed for publication with the proceedings.

MR. McGOWAN: Before the audience gets into confusion, I want to say that I have just been informed that I am the Chairman of the Committee on Resolutions. I am perfectly willing to take my part, but I fear that I cannot be considered as Chairman of this Committee from the fact that I expect to leave at 3:45. This report is generally submitted at the close of the last session. I will meet the Committee, but I think that someone should be named to take the responsibility of the Chairman of this Committee, and to name his time and place, and I will give my thoughts along that line. The Committee, I believe, is myself, Mr. Snavely, Mr. Eschbach, Mr. Woodward and A. P. Young.

The CHAIRMAN: Will Mr. Snavely take the Chairmanship?

MR. SNAVELY: I am going out early in the afternoon.

The CHAIRMAN: Is Col. Woodward present? The Colonel is gone.

MR. McGOWAN: If I would be permitted to name someone in my place, I would name Mr. E. B. Dorsett.

MR. DORSETT: It seems to be in order to make excuses. I believe I held that position last year.

The CHAIRMAN: You have come so long to the sessions, you will be the very man for the business.

MR. McGOWAN: I would like to ask the persons who were with me on the Committee on Legislation to please sign the report.

MR. FENSTERMAKER: The Executive Committee is to meet in the rear of the room before we adjourn.

The CHAIRMAN: Any other announcements? If not, the Board stands adjourned until 1:30 o'clock this afternoon.

Thursday Afternoon, 1:30 P. M.

S. S. Blyholder, Third Vice-President in the Chair.

The CHAIRMAN: The Board will please come to order.

The first thing on the afternoon program is the report of the Committee on Poultry, H. M. Gooderham, Chairman, Patton, Pa. Mr. Gooderham is not present, but his paper is here and Mr. Dorsett will read it.

MR. DORSETT: I will say for Mr. Gooderham that his reason for being absent is like that of some other brother—he is courting this week in Allegheny county, at Pittsburg. It is a good thing sometimes to do a little courting after marriage as well as before marriage. But this particular courting, I understand, is in the interest of pure butter. He just now is working for the Department in securing evidence against the illegal traffic in oleomargarine, and is being held as a witness in Pittsburg, and that is the reason for his not being here. I have his paper and will read it to you.

This report was then read by Mr. Dorsett, which is as follows:

REPORT OF THE COMMITTEE ON POULTRY.

By H. M. GOODERHAM, *Patton, Pa.*

It is not necessary that I take your time in telling you the amount of worth in dollars and cents "Biddy" is producing in the United States or in this State, nor is it necessary for me to tell you that the poultry product turned into money in this country is equalling or worth more money than the wheat crop, etc., etc.

But with all the great wealth she is producing, or work she is doing, let me turn your attention to the markets of this State and listen to the cry of the consumer for more eggs, fresher eggs, as well as more and better poultry for the table. When I stand near the wharfs in some of our towns and cities in this Commonwealth and see boat loads of chickens and eggs unloaded, as well as standing near freight stations and express offices, and see box loads as well as car loads of the same product unloaded, and not any of it produced or bought from the farms in our great Keystone State, I connot refrain at this opportune time from drawing the attention of this Board to the many thousands of hens of this State that have not laid an egg this winter, but are standing in some poorly ventilated, dirty, filthy, lousy coop eating their feed from an old pan or trough or from an ill-kept floor, waiting for Spring to arrive that she may get out and nearer to her natural conditions and start on the work of reproduction.

I am not speaking that I may discourage you, but rather as words of encouragement. If you travel over this State you will find one farmer in about every twenty-four whose hens are doing excellent work throughout the year; but you, as members of the Pennsylvania State Board of Agriculture, whose work it is to help to advance agriculture, about three hundred days in the year might, at the time

of our County Institutes or at other times, try and get the twenty-fourth man who is making a success of the poultry business to show the other twenty-three of his community, not only where the mistakes are, but how his success has been accomplished. This work could be done in addition to the good work which is being accomplished by the Department of Agriculture and our Farmers' Institutes.

Fresh air, ample sunlight and a well balanced ration are the fundamental principles of good egg production. Have good stock, always bred from the very best ancestral types until you attain the form, vigor, laying powers and market types desired. Stick to one form of fowls, have well ventilated, sun-exposed houses. Avoid mites, lice, pests and diseases by training your fowls to out-of-door habits. Do not pamper them by indoor treatment. Many chickens die from want of fresh air, fresh water, over-feeding, injudicious feeding of young chicks, by permitting them to have access to all sorts of dead, diseased and impure or filthy food. Train your fowls to be cleanly in habits and busy in out-door search of food.

The laying hen is always abroad early in the morning and lays her egg before mid-day. The manure from the hen properly cared for will more than repay for the cost of her keep for a year; hence, eggs cost you nothing from such a practice. Hens will lay, if properly bred, fed and cared for. It is as natural as life for them to do so. Not to lay and not to be busy is an abnormal condition. Caponize your cockerels. It pays. Percentage of mortality in caponizing is small when the art is understood. Do not feed new wheat to chickens. It sickens and kills them. Late molting in the fall is the result generally of being to busy laying eggs. Whitewash, disinfect and, best of all, fumigate your hen houses once or oftener in a year. Have few window-glass in your hen houses. In a great many instances you should have them open, save a curtain of good ducking, which can be lowered for emergency. Study poultry house construction and use good, solid, clean new yellow pine boards or good cement for flooring. Build the best houses. They are the cheapest in the end, and will last a long time. Feed boiled oats, pearl millet seed, cracked foods. Avoid too much yellow corn, save when fattening. Provide good sharp grit, preferably finely crushed and screened, and plenty of oyster shells. Fowls must have grit and oyster shells both summer and winter. Get pure bred stock and stick to the fixed type until you have traced out and fixed the quality. In turkey raising, let them sleep out of doors. Don't feed corn. Keep the best, most vigorous stock to breed from. A very good, perhaps, somewhat expensive feed, is raw egg stirred and stale bread intermixed. Do not feed hard boiled eggs. It's not wanted by baby chicks or turkeys.

I advise farmers of this State to pay more attention in detail to chicken and turkey culture. Market poultry and eggs are destined to go yet higher in the market and remain there in future years. Study your business well and stick to it until you succeed. Perseverance brings success in any business.

It is claimed that the sum of $5,798.00 is received to-day in Petaluma, California, from the sale of poultry and eggs. For the year 1908 the total receipts were $2, 116,604.00, divided as follows:

Eggs shipped,	$1,726,601.00
Poultry,	332,544.00
Baby chicks,	57,459.00

There are 1,808,436 hens kept in the vicinity of Petaluma.

Conservative figures place the estimate of eggs laid last year at 8,403,638 dozens. If all the hens in Petaluma Valley were to roost together in one straight line, it would make a poultry line of ninety-five and one-half miles in length. If a house were built for them with three rows of roost running lengthwise, it would need to be almost thirty-two miles long.

I only cite Petaluma, California, as one of the many places in this United States where money is being made in poultry, and I hope Pennsylania farmers will try to do likewise. I want to say, without fear of contradiction, that for money expended and labor involved, poultry is one of the greatest industries that farmers can follow in this great Keystone State of ours.

The CHAIRMAN: You have heard the report. What action will you take upon it?

On motion the report was received and filed for publication with the proceedings.

The CHAIRMAN: The next is the Report of the Meteorologist, Silas R. Eshelman, Harrisburg, Pa. Is Mr. Eshelman present? He is not.

The next then is the Report of the Mineralogist, Baird Halberstadt, Pottsville, Pa.

Mr. Halberstadt then presented his report, as follows:

THE PRINCIPAL LIMESTONE DEPOSITS OF PENNSYLVANIA AND THEIR ADAPTABILITY TO THE MANUFACTURE OF PORTLAND CEMENT.

By BAIRD HALBERSTADT, F. G. S., *Mineralogist, Pottsville, Pa.*

The increase in the production of Portland Cement in the United States within a decade has been phenomenal. From an annual production of 5,652,266 barrels in 1899, the production has increased to 51,072,912 barrels in 1908, or, in other words, more than nine and two-tenths (9.2) times as much Portland Cement was produced in 1908 as in 1899. During the same period a decrease in the annual production of Natural Cement has taken place. Of this cement, there were manufactured 9,688,179 barrels, while in 1908 but 1,686,682 barrels were produced.

The manufacture of Puzzolan or Blast Furnace Slag cement likewise shows a heavy decrease, for in 1907 its production is reported as being 557,252 barrels, while in 1908, this had been reduced to 154,451 barrels. Since the first slag cement was produced in the United States the production has fluctuated. While, perhaps, it is not fair to compare the figures of 1907 and 1908, for it is possible that the panic in 1907 and the resulting stagnation in business generally through-

out the country had something to do with the decreased demand for slag cement, it is hardly probable, since notwithstanding the business stagnation of the country in 1908, the increase in the production of Portland Cement in 1908 over that of 1907 was 2,287,522 barrels. The value at the works of the Portland Cement produced in 1908 was $43,547,679, that of the Natural Cement was $834,509, and Slag Cement $95,468. The average prices per barrel f. o. b. at works in 1908 were, of Portland Cement 85c.; of Natural Cement 49 1-2c.; and of Slag Cement 63c.

Each year finds the uses to which cement is put growing wider. Where formerly it was used on the farm only for walks, cellar floors and concrete, we now see it very generally used, not only in foundation, house and barn construction, but for troughs, silos, tile-drain pipes, box-stalls, pig-pens, milk and dairy houses, water-tanks, cisterns, fence-posts, etc. It is rapidly replacing wood wherever either can be used. Among its advantages over wood may be mentioned its durability and sanitary qualities, for the former decays, while the latter—if the mixture be properly made—increases in strength with the passage of time. From a sanitary point of view, cement is far preferable to wood.

In view of these facts, so important to the farmer, and that perchance he may have beneath his farm a valuable deposit of limestone suitable for the manufacture of cement, I have selected this topic for my Annual Report as your Mineralogist.

At the very outset it is desired to impress on all land owners that the mere possession of a deposit of argillaceous limestone is not in itself sufficient to warrant the erection of a cement manufacturing plant, for there are other factors in the equation which are of as much importance as the limestone deposit itself, and unless these essentials are met, no plant will be financially successful.

Assuming that a sufficient deposit of raw material (*i. e.* either an argillaceous limestone or other material from which a Standard mixture can be made) is present and can be quarried at a moderate cost, much depends upon the question of cost of fuel, the freight rates and proximity to the markets. Unless all these requirements are fulfilled, financial success will not be met. Although it is not probable that the farm land owner will attempt to erect a Cement plant himself, it is possible that he may be called upon by legitimate investors, speculators and fakirs in search of deposits of good "raw material," and it is to caution the farmer against the last two named classes that I especially desire. These may excite false hope of great gain in order to filch a few dollars from the farmers' purses by urging them to have examinations and analyses made, when they know, if they be competent and honest, that under the conditions required success would be impossible.

While it is unquestionably true that Pennsylvania has been most bountifully endowed with excellent "raw material" for making Cement, and that beneath many of the counties millions of tons of argillaceous limestone adapted to this purpose exist, yet their geographical and geological positions may be such as to make it unprofitable to quarry them.

Again, its structural condition may be such that the expenses incurred in quarrying the rock would be too great to permit competition with others having more favorable structural conditions. In other words, there are many conditions that must be very carefully considered when either purchasing or selling land underlaid or supposed to be underlaid by a limestone suitable for cement purposes.

THE LIMESTONES.

The distribution of limestone deposits in Pennsylvania is very wide. Near the lower part of the geological columnar section lies a thick and very persistent limestone known as the Trenton or No. 11 limestone. Its eastern outcrop is found in Northampton county, and it is readily traced across Lehigh, Berks, Lebanon, Dauphin, Lancaster, Cumberland, York and Franklin counties to the Maryland line. It also outcrops in Chester, Montgomery, Bucks, Southeastern Adams, Fulton, Perry, Bedford, Blair, Centre, Huntingdon, Mifflin, Juniata, Clinton and Lycoming counties (23 counties). In some of these it shows a wide outcrop, while in others it may be called patchy. This formation lies at the top of what geologists have termed the Cambro-Silurian Period. Geologically, it is the lowest limestone in the Pennsylvania column of rocks from which cement is manufactured.

In this formation is found the Cement Rock of the Lehigh region and from this the greater portion of Pennsylvania's production of "raw material" is obtained. It varies from 250 to 300 feet in thickness. Because of its argillaceous character it has a slaty fracture and, as the percentage of calcium carbonate increases or decreases in it, its color changes from a light to a very dark gray.

Beneath the Cement rock lies the Magnesium, or what has been recently named the Kittatinny limestone. At some of the quarries in Northampton county the composition of the rock so closely approximates the ideal mixture for Portland Cement, that it is used just as it comes from the quarry. At most of the Lehigh district plants, however, it becomes necessary to increase or decrease the calcium carbonate percentage by mixing with the cement rock a rock rich in lime, or shale, when the rock exceeds or falls below the proper limit of the percentage of lime.

The next limestone deposit of economic importance, in ascending order, is that known as the Lower Helderberg (No. VI) limestone (any limestone strata found between the Trenton (No. 11) and Lower Helderberg limestones can be dismissed without further consideration), the upper member of the Upper Silurian division of the Silurian Age. It outcrops in Monroe, Carbon, Schuylkill, Lebanon, Perry, Huntingdon, Fulton, Franklin, Bedford, Blair, Centre, Clinton, Lycoming, Northumberland, Union, Montour, Columbia, Snyder, Juniata and Mifflin counties. This will give some idea of the wide distribution of the limestones of the Upper and Lower Silurian periods within the Commonwealth.

Still higher, geographically, and within the Sub-Carboniferous and Carboniferous formations in Western Pennsylvania, a large number of limestone strata exists. Some of these are not, however, persistent; that is to say, they may be present in some areas while in others their occurrence may be sporadic or entirely absent. Of all the Coal Measure limestones, the Ferriferous or Vanport limestone, the hori-

zon of which is between the Lower Kittanning and Clarion coal beds is the most persistent, has a wider area and is the richest limestone of the entire series. This deposit outcrops in the counties of Elk, Jefferson, Clarion, Armstrong, Butler, Beaver, Lawrence, Mercer, Venango and in the northwestern corner of Indiana.

The appended table shows the number and horizons of the Coal Measure limestones of Western Pennsylvania:

List of the Principal Limestones of the Coal Measures of Southwestern Pennsylvania.*

Formation.	Name.	Approximate Stratigraphic Position.	Maximum thickness.
			Feet.
Dunkard formation, or Upper Barren measures.	Upper Washington limestone (No. VI).	Top of Washington formation, 250 to 425 feet above Waynesburg coal.	30
Monongahela formation, or Upper Productive measures.	Waynesburg limestone,	20 feet below Waynesburg coal.	35
	Benwood or Great Limestone:		
	Upper member, or Uniontown limestone.		18
	Lower member,	120 feet above Pittsburg coal.	90
	Sewickley, or Fishpot, limestone.	Over 100 feet above Pittsburg coal.	30
	Redstone limestone,	30 to 70 feet above Pittsburg coal.	10
Conemaugh formation, or Lower Barren measures.	Pittsburg limestone,	20 feet below Pittsburg coal,	12
	Elk Lick limestone,	Midway between Pittsburg and Upper Freeport coals.	6
	Ames, or Crinoidal, limestone.		8
	Upper Freeport limestone,	Below Upper Freeport coal,	28
	Lower Freeport limestone,	Below Lower Freeport coal,	5
Allegheny formation, or Lower Productive measures.	Johnstown limestone,	Below Upper Kittanning coal.	10
	Vanport, or Ferriferous, limestone.	Below Lower Kittanning coal.	22
Pottsville formation,	Upper and Lower Mercer limestones.	Between Homewood and Conoquenessing sandstones.	4
Mauch Chunk formation,	Greenbrier, or Mountain, limestone.		3
	Loyalhanna, or Siliceous, limestone.	40 to 50 feet above bottom of Mauch Chunk.	30
Pocono formation,	Benezette limestones of Elk county.	Upper portion of Pocono,	60
			7

Besides the beds named in the table, there are many thin and local limestones, among which the Jollytown, Little Pittsburg, Middle Washington, and Lower Washington have been given names, but are nowhere known to be of much economic importance.

The thicknesses given in the table are the extreme maxima known to exist, and should not be accepted as likely to occur over wide areas. The average amounts in each case are probably considerably less than half those given. In distribution the thickest beds are toward the southwest, but even there they rarely exceed a few feet, and beds averaging over 20 feet are only about three in number.

*F. G. Clapp, Bulletin No. 249, U. S. Geological Survey.

No limestones of any economic importance have yet been discovered in the Anthracite Coal Measures. In the northern field, however, in the vicinity of Wilkes-Barre, four or five beds of limestone, varying from 1 foot to 3 feet in thickness, have been found, but, as has been said before, they are unimportant in an economic sense. Even though important from a geological point of view, further consideration of them here is unnecessary.

Before entering into a discussion of the requisites of a suitable mixture of "raw material" for Cement manufacture, it will not be out of place to explain briefly the origin of limestone, since it is the most important constituent of the "raw material" of Cement and the indispensable raw material for lime, etc.

The term limestone has been employed both popularly and technically to designate any rock or rock masses which are mainly composed of calcareous material or carbonate of lime. The origin of limestones may be due, in some cases, to organic, while in others, to inorganic agencies. In the first, through the accumulation of the calcareous material of mollusks, corals, foraminifera, etc., in vast numbers, upon ocean floors which were subsequently or during the time of their deposition cemented by the deposition (chemically) of calcium carbonate from solution.

In the second case, they are due to the deposition from solution through chemical agencies, as for example, Calcareous Tufa, Travertine and cave deposits.

Limestones vary much in chemical composition and physical appearance. The variations may be so great that a limestone that is perfectly suited for one purpose may be useless for another, hence in sampling deposits great care must be exercised. Should the deposits be made up of two or more benches, each bench should be sampled and a separate analysis made, otherwise an incorrect conclusion may be arrived at. One stratum may be valuable, while others carry too high a percentage of impurities. Variations in purity may occur in a single stratum; the upper part may be impure, while a sample taken from another part may be very good. It sometimes happens that great differences in chemical composition may be found even in the layers separated from each other by even an inch or two.

A limestone which, when calcined, makes a fine lime is not in itself alone suited for making Cement, while on the other hand, good material for Cement would be unsatisfactory, if burned, for lime; for in the first it is too rich in carbonate of lime, and in the other the percentage of impurities is too high.

Still another point: Limestones are sometimes too high in carbonate of magnesia to be suitable for the manufacture of Portland Cement. If the percentage of carbonate of magnesia exceed 6 per cent., a good cement can not be made from it, for it has been found that cement made from a rock carrying that percentage of magnesium carbonate will, in the course of time, swell and cause the cement mass to crack. A too great percentage of free lime has practically the same effect. Moreover, some of the highest authorities agree that if the magnesia constituent exceed 6 per cent. in the "raw" mixture, a falling off in tensile strength will result.

Limestone for the manufacture of lime for fertilizing purposes should not contain an excessive amount of alumina or silica, for these, like a high percentage of ash in coal, are undesirable. The excellent report of Dr. Wm. Frear* so completely deals with the uses and effects of lime on soils, that further discussion of it here is unnecessary.

LIMESTONE FOR CEMENT PURPOSES.

To obtain a mass of limestone, that upon chemical analysis, will show that it contains the exact proportions of Calcium Carbonate and other constituents, without variation, is a difficult matter.

The greatest fault that can be urged against the Natural Cement rock product is its lack of uniformity, hence the increasing demand for the Portland Cement, which is made from an artificial mixture. Through artificial mixing large deposits of limestone, which alone would not yield a satisfactory or even desirable product, can be utilized. Some of the strata may be too high in calcium carbonate, while in others it may be too low. Now, by intermixing these in the proper proportion, an ideal Portland Cement mixture can be obtained which, if carefully calcined and treated with equal care subsequently, a highly valued product will be obtainable. The high esteem in which the Portland cements of the Lehigh and some other districts are held, has only been made possible by long years of experimentation, the expenditure of vast sums of money and the possession of rock masses easily available for use at a reasonable cost.

While it is not always a safe guide in selecting a *Standard,* from which other commodities—rocks, iron ore, coal, etc.—are to be valued, one is generally rather safe in taking the opinions of the purchasers or users. The continual use of a certain ore or coal (and it is assumed that others are available at the same cost) would indicate that satisfactory results have been attained, otherwise a change would have been made.

It is pretty generally conceded that no better Cement is made than that produced along the Lehigh River in Lehigh and Northampton counties, and that as a cement, whose chemical analysis approaches or recedes from that of the Lehigh region, its value is determined; in other words, it is a good Standard from which others are to be judged by comparison.

The best results have been obtained when, upon analysis, the mixture ready for the kilns shows that it contains, say 76 per cent. of Calcium Carbonate and 20 per cent. of clayey material, the latter consisting of alumina, silica and oxide of iron. The Carbonate of Magnesia should never exceed 6 per cent.

The Cement rock proper is an argillaceous limestone, carrying from 60 per cent. to 80 per cent. carbonate of lime and from 15 per cent. to 30 per cent. of alumina, silica and oxide of iron. To bring the mixture up to the Standard, as given above, it is necessary, in some cases, to add to it some of the rock of the purer limestones found below; while in others some of the overlying shale must be added to reduce the percentage of calcium carbonate. It is interesting to study the variations in the character and chemical composition of this formation. Near the point of contact with the Hudson River shale, the

*Annual Report, Department of Agriculture, 1900.

next highest formation, the rocks are impure—the impurities (alumina, silica and iron oxide) almost equaling in amount the calcium carbonate. Below, the impurities rapidly decrease and the rocks become almost pure carbonate of lime. With the increasing purity, the rocks lose their shaley structure and become massive. They likewise lose their dark color and assume the dark gray characteristic of the better grade of limestone. "The cement rock," writes Mr. Eckel,* "is a dark gray to black slaty limestone, breaking with an even fracture into flat pieces, which usually have smooth, glistening surfaces."

Analyses of the Lehigh Cement rock demonstrate that the rock is generally lacking in the carbonate of lime constituent by between 5 per cent. and 6 per cent., and that this deficiency must be made up by adding to it the purer rock, so as to bring it up to the required percentage (76 per cent.). At some of the quarries the reverse is necessary, *i. e.* a stone much less pure is added to reduce the percentage of Carbonate of Lime.

Thus it will be seen that with the exception of cases where the proper mixture is found in Nature, and since the Natural Cement rock, we have learned, varies greatly, it is necessary to have both the pure and impure rocks to secure dependable raw material for the manufacture of Portland Cement.

I want to impress upon you that, because of its variability, a Natural Cement rock alone is not to be depended upon and, even while it closely approximates the ideal mixture, it is far safer if rocks of higher or lower percentage of calcium carbonate than the Natural Cement rock itself are available, for increasing or reducing the calcium carbonate constituent.

It must not be supposed that the Trenton limestone or any other limestone, wherever found, will be adapted to the manufacture of Cement simply because they have been found so in certain localities. Each deposit must be measured, sampled and an analysis or analyses made to determine its adaptability to the purpose before deciding upon its purchase or the erection of a plant.

The following table* of analyses exhibits the composition of the materials from the Trenton limestone used in the Lehigh District:*

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*Bulletin No. 243, U. S. Geological Survey.
*Bulletin No. 243, U. S. Geological Survey, page 289.

	Cement Rock.								Pure Limestone.		
Silica (SiO_2),	15.05	19.0	19.08	22.22	13.80	9.52	19.62	14.20	2.14	3.02	1.98
Alumina (Al_2O_3),	9.02	4.4	7.92	7.24	6.08	4.72	5.68	6.14	1.46	1.90	.70
Iron oxide (Fe_2O_3),	1.27	1.1		.92							
Lime carbonate ($CaCO_3$),	70.10	69.5	67.07	63.45	76.08	80.71	69.78	74.30	94.35	92.05	95.19
Magnesium carbonate ($MgCO_3$),	3.96	4.5	4.06	4.56	4.51	4.92	4.90	3.24	2.18	3.04	2.03

In Western Pennsylvania several Portland Cement plants are using successfully material afforded by the Vanport limestone, while the Stewart Iron Company, of Sharon, Mercer county, is making a slag cement from the blast furnace slag and calcined limestone, the latter being derived from the Vanport limestone quarried at Wampum, Lawrence county, by the Crescent Portland Cement Company.

The Vanport (Ferriferous) limestone at the quarry of the above named company attains a thickness of 25 feet. It is divided into three (3) benches, the lowest being the purest, its Calcium Carbonate percentage being nearly 93 per cent. with a magnesia constituent of less than 1 per cent. The material of the benches is too high in Calcium Carbonate, and to bring this within the limits, the overlying shale is mixed with the limestone.

CEMENTS.

Cements are of two kinds, hydraulic and non-hydraulic. Under the head of hydraulic cements are classed Hydraulic limes, Natural Cement, Portland Cement, Slag Cement and Puzzolan Cement.

Hydraulic limes slake and set slowly, but alone they have but little, if any, strength. The limestones from which they are made contain from 15 per cent. to 20 per cent. silica and alumina.

Natural Cement is made from limestone high in impurities and burned at a low temperature. It does not slake in water, unless reduced to a powder. It hardens rapidly and will set under water, but lacks the uniformity and the strength of a well made Portland Cement.

Portland Cement. This is the most important cement and is made by burning, at a very high temperature, an artificial mixture of raw material, composed of lime, alumina, silica and iron oxide properly proportioned, to a clinker which, when reduced to a powder will set under water.

Slag Cement is produced by burning a mixture of limestone with blast furnace slag. When finely ground, this cement will likewise set under water.

Puzzolan Cement is produced by mixing powdered slaked lime with either volcanic ash or blast furnace slag. No burning is required.

The total production of Portland Cement in Pennsylvania, by counties, in 1908, is as follows:

	Barrels.
Northampton,	11,321,604
Lehigh,	5,920,317
Lawrence,	981,648
Mercer and York,	31,237
Total,	18,254,806

It is interesting to note that the price of Portland Cement has decreased from $3.00 in 1880 to $0.85 per barrel in 1908.

Mr. Edwin C. Eckel, the Cement Expert of the U. S. Geological Survey, in Bulletin No. 243 of the Survey, advises that before the erection of a cement plant, a very careful examination and estimate be made of the raw material in sight. He says it would, because of the expense involved in the erection of a plant, be folly to locate a plant with less than twenty years' supply of raw material in sight.

He estimates that the yearly supply of limestone and shale required for one kiln will amount to 20,000 tons, of which 15,000 tons are of limestone and 5,000 tons of shale. It will, therefore, be seen that at least 300,000 tons of limestone and 100,000 tons of shale will be required to supply a kiln for twenty years. Considering the quantity in dimension instead of weight, his figures show that the amount of limestone required will be 3,800,000 cubic feet, and the shale 1,600,000 cubic feet. Unless such a supply or a still greater one be available, the erection of a plant had better not be undertaken.

TABLE OF THE PRINCIPAL LIMESTONES OF PENNSYLVANIA COMPILED FROM VARIOUS REPORTS.

Names of Limestones.	Color.	Character.	Percentage of Calcium Carbonate.	Percentage of Carbonate of Magnesia.	Uses.	Remarks.
Upper Washington,--	Blue gray to bluish black.	Hard, compact, ----	72.866	3.813	Fertilizer — Not cement.	Available for cement, if constant.
Wayneshurg,* -------	Dark gray, ----------	Compact, ----------	----------	----------	Lime, ----------	No analyses.
Great Limestone, Uniontown, Lower.	Buff, ----------	Siliceous, ----------	a 47 to 69.0	a 14 to 30	Natural cement, ----	Some portions may be available for cement.
Sewickley, ----------	Dark blue, ----------	Compact, ----------	66 to 87	2 to 15	Fertilizer, ----------	Rather a pure limestone.
Redstone, ----------	Pearl gray, ---------	Hard, ----------		17.711	----------	Variable—high in magnesia.
Pittsburg, ----------	Bluish gray, --------	Soft and brittle, ----	83.0 to 89.0	1.7 to 2.9	Fertilizer, ----------	Usually of no economic value.
Elk Lick, ----------	Bluish gray, --------	Compact and brittle,	55.6 to 90.8	2.7 to 14.2	Fertilizer, ----------	Variable—high in magnesia.
Ames or Crinoidal,*--	Bluish or greenish gray.	Fossiliferous, -------	g 84.0	g 2.13	----------	Not of economic importance.
Upper Freeport, -----	Light gray to buff,	Brecciated, ----------	83.0 to 93.0	1.40	Fertilizer, ----------	Available for cement.
Lower Freeport, -----	Ligbt gray, ----------	Fine grained, --------	e 82.3 to 93.9	e 1.3 to 8.0	Fertilizer, ----------	Thin—variable.
Johnstown Cement.--	Bluish gray, --------	Hard, ----------	d 34.301	d 21.650	----------	Too variable for cement.
Vanport Ferriferous,-	Grayish, ----------	Fine grained, c -----	c 93.2 to 96.8	0.968 to 1.740	Lime and cement, ---	Generally pure limestone.
Upper and Lower Mercer. f	Grayish, ----------	Coarse grained, -----	h 40.0 to 64.2	h 1.171	----------	Not of economic value.
Mountain, ----------	Bluish to white, ----	Hard and soft variable.	g 60.0 to 92.0	g 2.0 to 16	Cement—fertilizer, --	Variable—fertilizer purposes.
Loyalhanna,* --------	Upper member blue,	----------	----------	----------	Ballast, ----------	Not adapted for cement.
Benezette, ----------	Bluish gray, h ------	Very brittle, ---------	76.143	1.74	Fertilizer, ----------	Sometimes good for cement.
Lower Helderberg, ---	Gray, bluish-gray, --	Compact, ----------	73.0 to 96	1.38 to 4.31	Lime and cement, ---	Rather pure generally.
Trenton, ----------	Bluish gray, ---------	Compact, ----------	60.0 to 98	.96 to 8.86	Lime and cement, ---	Adapted to cement manufacture.

*No analyses available.
a Benwood limestone in Washington county.
b Middle Bench, Elk county.
c Armstrong county.
d At Johnstown.
e In Jefferson and Indiana counties.
f Not of economic importance.
g In West Virginia.
h Near Tionesta, Forest county.
Note.—These results are not averages for the whole State, for in some cases, the figures and descriptions are based on a single locality.

The CHAIRMAN: Gentlemen, you have heard this report. What action will you take?

On motion the report was received and filed for publication with the proceedings.

The CHAIRMAN: Is there any discussion on the reports we have gone over or any questions to ask? If not, we will proceed. The next subject on the program is "Agricultural Education in Country Schools," by Howard Cox, Bellwood, Pa. Mr. Cox is not present, but he has written a letter to us explaining why he could not be here, giving a very good reason, having been subpoenaed to attend court this week.

DEPUTY SECRETARY MARTIN: Your Secretary has received a letter from Mr. F. A. Davies, a member from Susquehanna county, giving reasons for his not being present. Also a letter from Dr. James A. Harvis stating that Mr. Clark G. Long, a delegate from the Lebanon County Agricultural Society, was unable to be present owing to an attack of tonsilitis.

The CHAIRMAN: Gentlemen of the Board, yesterday when the credentials were presented the presiding officer made several rulings with regard to membership, one that a gentleman, who is now present with us and was present then, could not be considered a member and, of course, this gentleman had no opportunity of making an explanation of why he was here, and I think it is just and due and right that we should hear the explanation from Mr. McClellan, of Clarion county.

MR. McCLELLAN: Mr. Chairman, at the election one week ago Tuesday, my successor was elected and he was under the impression when I talked to him after the election that it was my duty to come to this meeting; also, when we were talking the Secretary of the Association came up and told him that it was my place to attend this meeting and also to attend the Institutes and hold the Round-up Meetings, and then I was there. I was elected nine years ago and I did not remember, as far as I was concerned, whether I came to the meeting right after being elected or held off. I did not remember that. I was elected continuously every three years after that for nine years, and I do not want this Board to have the impression that I was trying to intrude myself on them or on the State. All I wanted was to have a chance to vindicate myself. My intentions were all right in coming here, that the county should be represented. The other party told me he was not coming and I thought it was right that we should have the representation here, although my hands were tied. I did not have the privilege of the floor, did not feel like talking until I was accorded the opportunity. If I have made a mistake I don't want anybody to be responsible for it. That first three years I was on the Board we had to pay our own expenses. The second term I was elected by the Fair Association and they made provision for that, and did so up until the time the State made provision for it. So that I have paid for it heretofore and don't want to make any intrusion and, therefore, just want the Board to know I was not here at the expense of the State but my own interest and that our county should be represented.

Thank you for the opportunity to make explanation.

The CHAIRMAN: The reason I spoke of the matter, I thought it was just and fair that Mr. McClellan had the right to explain, because others had been afforded the privileges of the floor and right of delegateship who were not members of the Board.

Now the Board can take such action as it please.

DEPUTY SECRETARY MARTIN: I might, with your permission, Mr. Chairman, state that there seems to be an unfortunate hampering of the Board in taking action in reference to our good friend and brother, Mr. McClellan. He was so faithful for long continued years, been connected and done his part as a member of the Board, and not only as a member of this Board but as County Chairman of Institutes. Whilst there is a technicality in the Act governing our rulings here, that the term of office expires in January, the term of years having expired on the fourth Wednesday in January, as I understand it, then his successor coming in, yet it is my judgment that the Board should take such action as it seems best, not being binding at all, in regard to this matter, simply advisory, and whatever subsequent action would follow that would be altogether proper and in place. I know we all have full sympathy and feeling with the exchange of these two members, the coming in member and the going out member, and this is one of those things which seems difficult to reach under our actions here as a Board. I am simply saying this in addition to what Mr. McClellan has said. It seems to me the Board may take an advisory action.

MR. RODGERS: As Chairman of the Committee on Credentials, I would state that we did not have anything brought before us in regard to Mr. McClellan's case at all, so that we had nothing to act upon.

The CHAIRMAN: Did you have the credentials of the incoming member?

MR. RODGERS: I think we had the credentials before us. The Secretary has the report.

MR. FENSTERMAKER: Mr. Chairman, as a member of that Committee, I would state that we had no credentials whatever from Clarion county before us.

MR. SEAMANS: Mr. Chairman, if it would be proper, I would like to move that Mr. McClellan be considered a member of this Board until the close of this meeting.

The motion was seconded and carried unanimously.

MR. McCLELLAN: I certainly have to return my thanks to the Chairman and also the Board for the unanimous vote in favor of that. I appreciate it as a kindness and a favor.

MR. FENSTERMAKER: Mr. Chairman, the Executive Committee has completed its report and is ready to present it.

The CHAIRMAN: We will now have the Report of the Executive Committee, Mr. P. S. Fenstermaker, Chairman.

Mr. Fenstermaker then presented the Report of the Executive Committee:

REPORT OF THE EXECUTIVE COMMITTEE.

To the Members of the State Board of Agriculture of Pennsylvania:

Your Executive Committee beg to submit to you the following appointments and assignments (see page 7):

Respectfully submitted,

P. S. FENSTERMAKER,

Chairman.

The CHAIRMAN: You have heard the Report of the Executive Committee. What action will you take?

On motion the report was adopted as presented.

The CHAIRMAN: I just now catch the smiling countenance of our friend, Professor Watts, so we will hear from him.

Professor Watts then presented his paper, as follows:

ORCHARDING IN PENNSYLVANIA.

By PROF. R. L. WATTS, *State College.*

Men who have a knowledge of the markets of the world claim that the markets of this State are unsurpassed. Our two largest cities, Philadelphia and Pittsburg, consume enormous amounts of all lines of produce, while interior towns and cities demand an additional supply which is not realized by our land owners. The great lumber, mining and iron industries of the State have absorbed the interest of all classes, the farmer included, so that we have not appreciated the splendid markets in every section. While we have been busy looking after the wealth of natural resources, other states have been developing orchards to feed our people. Immense shipments of apples are sent from New York and the West to this State. Peaches are sent to our markets from Maryland, New Jersey, Delaware and Ohio. Grapes from New York; pears, plums and cherries from several states. But a change is taking place. Our people are beginning to appreciate the value of our home markets and to realize that soil and climatic conditions in this State are admirably adapted to a full line of fruits. Commercial orchards here and there are paying their owners good returns. Increased zeal is noticeable in many of the counties. County Horticultural Societies are being formed throughout the State and fruit culture is the most popular subject for discussion at many Grange meetings and Farmers' Institutes. Hundreds of students are going to State College to study Horticulture and hundreds of other young men are taking correspondence courses in fruit culture. A great educational campaign is on and it is a prophecy of much better days in orcharding in Pennsylvania.

The ultimate success of orcharding in this State depends primarily upon the quality of the fruit produced. Our markets are being educated and consumers are demanding quality more than ever before. The Ben Davis era is rapidly passing. This variety has made money for thousands of orchardists, but it will be in little demand in the future. People are beginning to ask for Spy, Stayman Winesap, Grime's Golden, Jonathan, Smokehouse, Spitzenburg, Newton Pippin and other varieties of strictly high grade. Apples of such varieties sharpen the appetite for more, thus increasing consumption. With our export trade it is not likely that we will ever have too many apples of the highest grade.

PLANTING AND CARE OF THE YOUNG ORCHARD.

Some soils and locations are better than others for the growing of apples, but good apples may be grown on any well drained and properly treated soil. It should be prepared for trees with just as much care as for potatoes. If sod land, plow in the Spring and plant corn. If desired, the trees may be planted with the corn, being careful that no corn stands closer than four feet from the trees. The trees should be properly fertilized and cultivated to secure a satisfactory growth.

Plant only varieties of high quality, unless varieties of fair quality are known to be especially successful in your locality. One year trees are preferred to older trees, although many successful growers are planting two year trees. The one year tree is usually difficult to secure because the nurserymen do not want to sell them. But they are worth more money and the grower should be willing to pay the additional cost. They give him full control of top formation.

Low heading has all the arguments in its favor. If the one year whip is cut off 32 or 34 inches from the ground and the bud for the first limb 10 or 12 inches below this, an ideal top can be formed. The three to five limbs should be distributed over this distance of 10 to 12 inches.

If the land is rough, stony or hilly, mulching can be followed to advantage. There is no doubt in the minds of experienced orchardists that the sod-mulch treatment when properly carried out is fully as satisfactory as clean tillage.

Companion cropping or inter-cropping in orchards is becoming more and more popular, because it enables the grower to meet the operating expenses of the orchard until the trees attain a bearing age. It is possible to do even more than this. Certain orchardists in New Jersey have purchased farms, planted them at once with trees, and by companion cropping have not only paid for the operating expenses, but have paid for the farms from the profits of the first few years' crops grown between the trees.

Companion crops which may be started early in the Spring and harvested in time to start cover crops are best adapted to this purpose. If the legumes can be used, they, of course, possess an additional advantage in being soil improvers as well as money makers. Peas and beans are grown in some orchards to good advantage. The crops are sold in the green state and the vines cultivated into the soil, thus supplying vegetable matter analyzing high in nitrogen. Other vegetables which are well adapted to companion cropping in orchards are early potatoes, dwarf varieties of early sweet corn, early tomatoes

and the summer vegetables, such as lettuce and root crops. Early potatoes are especially suitable for this purpose because they may be grown in a great variety of soils and can be sold in large quantities at prices which generally leave a good profit for the grower. One of the best orchards in Pennsylvania has been developed with potatoes as a companion crop. Several years ago H. C. Snavely, of Lebanon county, started a peach orchard and grew potatoes between the trees until the trees took full possession of the ground. The venture was a success, both from the standpoint of the potatoes and the trees. Whenever companion cropping is practiced, it is important to see that enough plant food is supplied to meet the needs of the inter-tillage crops as well as the trees.

Fruit growers everywhere are settling down to the fact that we cannot get the most economical results in orcharding without the use of cover crops. Cover crops are the means of furnishing nitrogen and vegetable matter in the most satisfactory manner and often most economically. Those crops which have the ability to gather the most nitrogen and store it in the soil are best for this purpose. We must also take into consideration crops adapted to soil and climatic conditions. Crimson clover is recognized as our best cover crop. It succeeds well in rather warm climates, but is generally a failure in the colder parts of the State, where the soils are heavier and more tenacious in character. For southeastern Pennsylvania it is decidedly the best cover crop. In the northwestern and colder parts of the State mammoth clover should be more generally used. It makes a more vigorous growth than red clover, thus adding more vegetable matter to the soil. Rye and vetch together should be more generally used in our orchards. This combination was used on the farms of the late Hon. R. F. Schwarz with the very best results. When orchard soils are especially lacking in vegetable matter, cow peas, soy beans and oats can often be used to advantage. These crops should be started in ample time to make a heavy growth before frost. In soils which are very much lacking in vegetable matter it is important to start cover crops earlier than is usually practiced. As the soil increases in humus and fertility it is possible to sow earlier and thus get more vegetable matter for manurial purposes.

Orchard experiments by Professor J. P. Stewart, of the Pennsylvania State College, indicate that nitrogen is the most valuable fertilizer that can be used in the young and old orchards of this State. It may be furnished by the application of nitrate of soda, barnyard manure or any other material that carries the right amount of nitrogen. It is also important to use the mineral elements in proper supply. Most of our growers have maintained that the all important thing in fertilizing is to make liberal applications of mineral elements without paying much attention to nitrogen. The better practice in all probability for most orchards would be to use complete fertilizers carrying a liberal amount of nitrogen as well as the mineral elements.

Fruit growers in every section realize as never before that spraying is one of the essentials in successful orcharding. The time is not far distant when every man in the State who attempts to grow fruit at all for market will spray more or less thoroughly. The results in spraying do not depend so much upon what is used but upon how the work is done. Either lime-sulphur solution or a good miscible

oil will kill San José scales if the sprays have been properly prepared and the applications thorough. The lack of thoroughness has been the cause of failures in the great majority of cases. One of the greatest insect foes of our orchards is the codling moth, and nearly all of our fruit growers are using arsenate of lead to control this pest. This poison can be used in connection with Bordeaux mixture or used alone. Lime-sulphur as a summer spray is attracting much attention and indications are that it will take the place of Bordeaux mixture in the control of apple scab, brown rot of the peach and other fungous troubles.

ORCHARD RENOVATION.

There is renewed interest in orchard renovation. Most old orchards in this State would return their owners handsome profits if the trees and soils were given the proper treatment. The best example we have of the value of renovation is the old orchard on the fruit farm of Tyson Brothers in Adams county. An old family orchard of fifty-four trees, occupying one and one-eighth acres was cut back very severely in the fall of 1903. The trees were very much lacking in vigor, the foliage poor and the fruit half size in dry seasons, with at least seventy-five per cent. of the specimens defective. The orchard produced scarcely enough good fruit to supply the family. The first thing accomplished was to cut out the tall central limbs clear back to the main trunk. Two cuts were often made to avoid splitting. The object was to induce a growth of new wood from the body of the trees to constitute the main part of the head. The orchard had not been plowed for ten years until 1904, when it was manured and plowed. The land was harrowed repeatedly during the summer. With this kind of treatment a great many suckers grew and it became necessary to remove most of them. A fair crop of apples was produced in 1905. 1906 was the off-year in Adams county and the crop was light. In 1907 the gross receipts from this orchard amounted to $884, and Tyson Brothers estimate that $600 of this amount was net. The crop in 1908, which was again the off-year, more than paid expenses, and although all the apples of 1909 have not been sold. these fruit growers estimate that the receipts will run at least $950. This old orchard was about as much run down as any orchard that can be found in the State. The trees were 37 years old when cut back. One old orchardist in Adams county informed me that 35 years is the limit of profits from the York Imperial, but the experience of Tyson Brothers indicates very clearly that it is possible to renew such old orchards and secure handsome profits. The pruning in old orchards consists, first, in the removal of all dead and dying wood and in cutting back tall and central leaders to the main trunk; second, in cutting back leading limbs six feet or more, being careful to cut to lateral branches which are located where they will fill open spaces, thus securing a well formed, rounded head; third, the thinning of suckers which form in large numbers. The most feasible plan, perhaps, is to leave more suckers than are desirable years later. These suckers will soon form fruit spurs and thus increase the yield, and it is a simple matter to thin them later in the life of the orchard when the top becomes too dense. After prunning, which may be done any time when the trees

are dormant, a thorough application of lime-sulphur should be made to destroy scale insects and to smooth the bark of the trees. A few applications of lime and sulphur will give the trees a much healthier appearance. Most old trees have been checked in growth and special soil and fertilizer treatment is necessary to start new growth. There is nothing better, or perhaps quite so good, in the long run as barnyard manure. A covering of several inches should be made under each tree and then plowed or disked into the soil. Deep plowing should be avoided. The aim should be to secure as deep mulch as possible and not injure the roots. Such tillage should be given early in the spring before the small and tender roots have formed. If for any reason it is not practical to cultivate the soil, the same results can be secured by heavy mulching, using any kind of straw. Strawy manure will serve the purpose better in old orchards in which the growth has been stunted. When clean tillage is practiced, the harrows or cultivators should not be used after mid-summer. It is important to start cover crops early so as to secure a maximum growth during the fall. The greatest need of our old orchards is vegetable matter and a course of green manuring should be adopted, which will give the maximum amount of material to plow down in the spring.

The greatest problem of the Pennsylvania fruit grower is that of marketing. The packer of the future will be forced to exercise greater care and skill in preparing his fruit for market as well as in making disposition of the fruit. The barrel package will probably always be standard, but it is interesting to note the increased popularity of the bushel box. This is the standard package of the West, and it is being sent to our large markets in the East in such large quantities that eastern growers are taking up the question and making arrangements to pack part of their crop in this package the coming season. Some Pennsylvania growers used the box pack the past year. For example, N. J. Lewis & Brother, of Luzerne county, are packing in boxes this winter such varieties as Baldwin, Spy, Rhode Island Greening, Rome Beauty, Smokehouse, Seek-no-further and Newton Pippin. These apples are wrapped in paper and packed in bushel boxes. The number of apples in each box is 45, 88, 96, or 112, and the boxes containing 96 and 112 are most in demand. The price ranges from two to three dollars per box, and they are sold direct to consumers. The apples have been shipped to towns covering most of the eastern part of the United States, and are sold by what is known as the endless chain system, i. e., a few boxes were sold last fall to city consumers, who were willing to pay the price for first-class apples, and a letter accompanied each shipment with the request that the purchaser tell his neighbor about the fine apples which he secured from the Luzerne county growers. This letter has accompanied each box during the winter, with the result that the entire crop will soon be sold at the good prices named. The bushel box is a convenient package and appeals to the consumer. It is possible that small boxes holding a half bushel or a peck would be popular with people who do not care to buy as much as a bushel.

A great deal has been said and written lately about the profits of apple growing in the famous apple sections of the Northwest. No one doubts the adaptibility of this region for the growing of apples, and while we have dreams and visions of the apple sections in the

West, we should not lose sight of the fact that just as great opportunities for fruit culture are afforded right here in Pennsylvania. The exhibits made recently at State College and Tunkhannock of Pennsylvania apples in competition with Western fruits show that our State is growing apples of just as high color and of better quality than the Northwest. But how about the profits? Can figures be presented which show that the business is as profitable in Pennsylvania? Yes, there are many in this State whose profits are probably equal if not greater than in the Northwest. Not long since, Mr. C. J. Tyson, Secretary of the State Horticultural Association, delivered a lecture at State College in which he compared the profits of apple culture in the West with the East. He went to the bottom of this whole question and the figures presented were authentic. He said that when Spitzenburg apples were selling for three dollars per box in New York at wholesale and Newton Pippins at two dollars and fifty cents, that the Adams county grower could count on two dollars and fifty cents for York Imperial. The cost of preparing for market in the Northwest is generally conceded to be about one dollar per box. The freight to New York is fifty cents and the commission is fifteen cents. This makes a total of one dollar and sixty-five cents, or a profit of one dollar and thirty-five cents per box. This, however, does not take into account the interest on the land. Such land is usually valued at one thousand dollars per acre, and the interest on this amount would be sixty dollars. In the regions referred to the average yield is about three hundred boxes per acre. This would make an average of three hundred and seventy-five dollars per acre, but with the interest deducted, it is three hundred and fifteen dollars. Assuming that it costs as much to grow high grade fruit in Pennsylvania as in the Northwest, which is probably not true, we have one dollar for cost of production and preparation for market, fifteen cents commission charges and ten cents for freight to New York. Total expenses are one dollar and twenty-five cents per box. If the apples were sold at two dollars and fifty cents per box, there would be a profit of one dollar and twenty-five cents, and three hundred boxes per acre would give us a profit of three hundred and seventy-five dollars, deducting five dollars for interest (land valued at one hundred dollars per acre), and there is a net profit of three hundred and seventy dollars per acre or fifty-five dollars above the average results of the famous orchards of the Northwest. Orcharding in this State looks like a good business proposition, but our people must bear in mind that large profits cannot be secured without being just as thorough as the fruit growers of the Northwest. With the keen competition of the Northwest and the general awakening in this State, it is useless for anyone to consider planting orchards unless they intend to till, feed, prune, thin, spray and do everything according to the most approved and up-to-date methods.

The CHAIRMAN: You have heard the paper. What action do you wish to take?

On motion it was received and filed for publication with the proceedings.

PROFESSOR WATTS: I want to add a little to the subject of orchard renovation. There are 225,000 farms in Pennsylvania, and most of them have old orchards. What will we do with them? At

the present time they are the harbors of insect and fungus foes. They ought to be cleaned up. I am going to argue on the ground that it will pay in dollars and cents to fix up the old orchards. If experiments are worth anything, everything points to the fact that it will pay to renovate the old orchards. They are a disgrace to our State. A lot of these old orchards are simply brush heaps, where all sorts of scale insects and fungus diseases have full sway the year round, and when you go out in the Fall to pick your fruit you have nothing but wormy and faulty specimens. We have an old-orchard at State College. The trees are fifty years old and we are talking about having some sort of a celebration in honor of the old orchard.

We expect to put this orchard in better shape, and you may desire to know how it will be done. Some of these old trees have leaders running up from the centre of the tree. Some of these will be cut back to the body of the tree, because we want an open centre to let the light and sunshine in. From around the bases of these leaders will grow a lot of water sprouts, and that will make it necessary for us to thin them later, keeping a few to form the main body and centre of the tree, and these suckers will, in the course of two or three years, begin to produce fruit. Later on, after bearing begins, it will be necessary to thin again. Another thing will be to cut out all dead and dying wood. We will also cut back all long limbs to side branches. We will cut back to side branches, which are leading out into open spaces. All these wounds will be covered with pure white lead paint to keep out moisture and fungous troubles. The next thing will be to spray lime and sulphur. It will be the concentrated, the lime-sulphur prepared at the College. We have been making it for less than $4.00 a barrel (concentrated lime-sulphur), just as good as the commercial brands, which cost $9.00 to $11.00. Students will make and apply it. By spraying with lime-sulphur we expect to smooth the bark and kill the scale, and in the course of a few years we will have a lot of old trees very much improved in appearance. In the Spring we will spray for the codling moth with arsenate of lead and later with fungicides. The probabilities are that lime-sulphur as a Summer spray will take the place of Bordeaux mixture.

A Member: Do we understand that your first codling moth spray will be with Bordeaux or with arsenate of lead?

PROF. WATTS: No, sir; arsenate of lead first and then Bordeaux.

A Member: What thickness will the limbs be that you cut back?

PROF. WATTS: Two to five inches.

A Member: How about those eight or ten inch limbs on an old tree?

PROF. WATTS: Are the old trees doing any good for you?

A Member: None at all.

PROF. WATTS: Then you will not lose much if it should kill them. But the trees would likely be benefitted by such treatment.

A Member: Suppose there is a hole in it?

PROF. WATTS: Plug it up with cement to keep out the moisture and insects.

Now, what else should be done to the old orchard? If we had an orchard on a hillside, we would mulch the trees and there is nothing better than barnyard manure for this; straw, potato vines and other debris may also be used. This brings up the old question of tillage versus mulching. It is nothing more than a common sense proposition. Heavy mulching will give just as good and as large fruit as tillage.

A Member: Can you start a young orchard under mulching?

PROF. WATTS: You can. Prof. Stewart told me recently that the young trees in our orchard have made greater growth with mulching than with tillage. Why, the probabilities are that we can mulch these old orchards and get as good results as by tillage. If you cannot mulch, cultivate. One of them must be done to get the best results.

A Member: Will it be safe to start cultivation after trying the mulching for several years?

PROF. WATTS: I do not think it would be very desirable. The cultivation would have to be very shallow for you should not cultivate after the young roots have started; you might by beginning very early, possibly. But I should rather recommend that after starting to mulch, the system be continued, and yet I believe it could be changed gradually.

A Member: What was the size of the boxes you spoke of?

PROF. WATTS: Bushel. I think there is a place for smaller boxes, a half bushel box or fancy basket. Something to catch the consumer. I think there is room for some unique methods of marketing.

A Member: Is the Stayman Winesap a good apple to plant with York Imperial?

PROF. WATTS: In many sections. We are not able to point to trees that are bearing in the northern part of the State.

A Member: What would be your choice for northern section?

PROF. WATTS: Old varieties, as Baldwin and Spy.

A Member: How about York Imperial?

PROF. WATTS: Not in the northern part. I am not in favor of planting York Imperial except in Southeastern Pennsylvania.

MR. DERR: We raise York Imperial in Montour county as high as 32 bushels to the tree.

PROF. WATTS: In the northern parts of the State it is inclined to be undersized.

A Member: What do you know about the Gano?

PROF. WATTS: First cousin of Ben Davis; more highly colored.

A Member: It will do for a new name for the Ben Davis.

PROF. WATTS: It may be a trifle better, but I would not plant it.

A Member: Under the mulching system, should you mulch every year?

PROF. WATTS: Yes, sir; every year.

A Member: Simply add enough to keep to the proper depth?

PROF. WATTS: Yes, sir.

A Member: What about York Stripe?

PROF. WATTS: Very little better than Ben Davis.

A Member: Rome Beauty?

PROF. WATTS: Very closely related to York Stripe both in flavor and quality. There are places where the Rome Beauty is successful, but the quality is poor. I have never eaten a good one.

A Member: Hubbardston?

PROF. WATTS: Is a good apple.

A Member: York Stripe does well in my orchard; better than Ben Davis and some others.

PROF. WATTS: I will grant that. It is too poor to meet the demands of future markets. We are planting for five, ten to twenty-five years hence.

A Member: Smith's Cider?

PROF. WATTS: Low grade.

A Member: Grime's Golden?

PROF. WATTS: High grade apple. One of the best in quality, well adapted to many sections, especially the lower latitudes.

A Member: Roman Stem?

PROF. WATTS: Is of fine quality.

A Member: Old-fashioned Rambo?

PROF. WATTS: The best in quality. Keep the Rambo in mind for quality and you will not go far astray.

A Member: The Jonathan?

PROF WATTS: It is an apple for special locations. Plant Jonathan on high ground where it will not want for a supply of moisture. High ground and a constant supply of moisture are the conditions for the best results. The Jonathan is very subject to scab. Spray with lime-sulphur.

A Member: How about Smokehouse?

PROF. WATTS: We ought to grow more of them. It is one of our best apples. Nothing better than Smokehouse. People know this apple. Mr. Hiester can't sell any other variety when there are Smokehouse on hand.

A Member: The Smokehouse is an easy tree to prune.

PROF. WATTS: Yes.

A Member: What about the Winter Banana?

PROF. WATTS: I do not know very much about this apple. I don't believe it will retain its flavor while in storage. I have had one or two good samples from Adams county and they were fine.

A Member: That was discussed at several meetings and the same point came up at the State Nurserymen's meeting, at York, and it seemed to be decided that if you have to store it, it loses its flavor.

A Member: What about the Pound apple?

PROF. WATTS: The Pound apple is one of the old apples. Mr. Hiester says it is the best apple to sell to the Insane Hospital. But the Fallowater will never be a great commercial apple. It bears every year, but I would not plant it. The quality is only fair.

A Member: What three varieties would you plant?

PROF. WATTS: Where do you live?

The Member: Central Pennsylvania.

PROF. WATTS: What county?

A Member: Juniata.

PROF. WATTS: If there is one thing I dislike to do it is to tell a man what to plant. There is always danger of making a mistake. I will tell you the varieties I would consider. First, Stayman Winesap; I should plant some York Imperial, not too many; quite a bunch of Smokehouse, because that variety does well; a few Summer Rambo, and put them up in fancy style to send to New York and Philadelphia.

A Member: The Gravenstein does well. How about it for quality?

PROF. WATTS: A very fair apple.

MR. YOUNG: What has become of the Belleflower? The Belleflower is a favorite of mine.

PROF. WATTS: I hesitate to recommend the Belleflower for commercial planting, and yet in Wyoming county it is being planted to some extent for commercial purposes.

MR. YOUNG: What would you say about it?

PROF. WATTS: It is a good apple. It is adapted to the colder parts of the State, but if you have conditions which are unusually adapted to Belieflower and treat your trees right, you can produce a Belleflower in competition with California people that will be better in quality. Pack it as a box apple. There is a place for Belleflower. It has no place as a common barrel apple.

A Member: What about alfalfa as a sod mulch for trees, 12 to 15 inches?

PROF. WATTS: I see no objection to it, if you can get the alfalfa to do well.

A Member: Should it be kept away from the tree?

PROF. WATTS: Yes; keep it away from the tree.

A Member: Would not the alfalfa penetrate too much?

PROF. WATTS: Perhaps so; I would want to experiment first before using it on a large area.

A Member: What about the Fameuse apple?

PROF. WATTS: Splendid little apple; very delicate; highly colored; hard to ship. There is a place for it.

A Member: The Wealthy apple?

PROF. WATTS: Is of low quality.

A Member: Delaware Red?

PROF. WATTS: Quite a good apple.

A Member: The Wagener

PROF. WATTS: Very good apple.

A Member: It is a very young bearer.

PROF. WATTS: Good bearer and excellent as a filler.

A Member: What other good filler is there?

PROF. WATTS: The Yellow Transparent, Wagener and Oldenburg.

A Member: The Baldwin?

PROF. WATTS: The Baldwin is a standard apple in the colder sections of the State.

A Member: The King?

PROF. WATTS: Has some objections; perhaps the most serious is the tendency to drop and the trees are short lived.

A Member: Can you prevent the dark spot in the Jonathan?

PROF. WATTS: Yes; by the use of lime-sulphur.

A Member: Can you prevent the rot in Spy?

PROF. WATTS: Yes; by thorough spraying with a fungicide.

The Member: It is one of our best apples but nearly all rotted.

PROF. WATTS: The proper use of Bordeaux mixture or Lime-sulphur will prevent rotting.

A Member: What do you know about Rawles' Janet?

PROF. WATTS: Very little; what do you know about it?

A Member: A very fine apple; small in growth; a long keeper.

PROF. WATTS: There must be a catalogue of the American Pomological Society in the room.

DR. CONARD: I didn't get through with this re-heading matter. I have some trees 55 years old. I think the trunks are 20 inches in diameter. The orchard was headed as high as my head. They grow away out into space and have great immense limbs 12 inches and more in diameter. We had a very heavy sleet storm that tore that orchard to pieces and when I got hold of it the broken limbs had been cut off close to the trunk and, of course, dead wood is getting back in the trunk and they are lop-sided and straggly, and a good many water sprouts are coming out around where the limbs are broken off. The question is whether I could cut off these big limbs and let the water sprouts make the limbs.

PROF. WATTS: I have only one suggestion to make. If you were a very old man and had to undergo a surgical operation you would want your body in a good condition. That is the idea with the trees. If you think the old trees may not be able to stand it, begin to feed and get them in good growing condition before you cut off the limbs and they will stand the shock better.

A Member: Would you use fertilizer for old orchards?

PROF. WATTS: Have you barnyard manure you can use?

A Member: Yes, sir.

PROF. WATTS: Then I would reduce the amount of nitrogen and use the manure. A fertilizer that would carry 8 per cent. of phosphorus and 10 per cent. potash, if your trees are making ample wood, could be used with the manure.

A Member: The manure has no bad effect on the quality of the fruit?

PROF. WATTS: No, sir; if you balance up with the mineral elements.

A Member: Do you mulch right up to the tree, against the body?

PROF. WATTS: No; keep the mulch a foot or two from trunk of the tree.

DR. CONARD: In cutting large limbs, do you cut level or in a slope?

PROF. WATTS: The rule is to cut more or less parallel with the body. You can compromise to a certain extent. The nearer you can get your cut the better it is. If you leave a stub the healing over cannot well be accomplished.

A Member: Does it make any material difference when the tree is trimmed?

PROF. WATTS: My preference is to prune in the spring of the year.

The CHAIRMAN: Had you any experience with the Baldwin apple having dark spots? We have trees in our orchard bought from one nursery affected and trees from another nursery not affected,

PROF. WATTS: I do not know why that should occur. This trouble is caused by a fungus.

A Member: Is there such a thing as a certain variety of apple being immune from scale? They claim Smokehouse apples growing alongside the Baldwin, with the Baldwin almost out of business, there is no scale on the Smokehouse.

PROF. WATTS: I don't think that there is any variety that is immune to scale.

A Member: How about the Smokehouse apple?

PROF. WATTS: I don't know. I cannot answer that question. It cannot be immune to scale.

MR. FENSTERMAKER: Just give them a little time and they will reach it. We had the same trouble in Lehigh.

PROF. SURFACE: What time would you apply the barnyard manure for fertilizing the orchard?

PROF. WATTS: Any time I had it. Of course, you will get more benefit by putting it on before growth begins in the Spring. If applied after the 1st of July your wood growth is practically made and you would not get so much benefit as you would if put on earlier.

A Member: When the ground is froze it is liable to lose during the Winter time.

PROF. WATTS: It will not lose as much as you think or as in the stable. I think the safest plan is to apply it.

A Member: Would you advise putting the manure on now with the ice on the ground?

PROF. WATTS: No, sir; because if a heavy rain should come it would wash away more or less of the manure; but if the ground is simply frozen I would not hesitate.

A Member: Would you advise wood ashes?

PROF. WATTS: Yes; wood ashes are all right; they are not worth much if leached out.

MR. BARNES: I have used barnyard manure on my orchard every month in the year and under the present conditions, and I feel safe to say that by putting barnyard manure on the orchard I got more money value out of it than any other use I have made of it, and I got greater returns by putting it on in the winter months than during any other time of the year.

MR. FENSTERMAKER: The Executive Committee desires to amend its report. We desire to amend that part, "Geologist, W. H. Stout," by substituting, "Economic Geologist, Dr. Isaac A. Harvey, of Lock Haven; and Agricultural Geologist, W. H. Stout, Pinegrove."

The CHAIRMAN: What action will you take on the proposed amendment to the Executive Committee's Report?

On motion duly made, seconded and carried, the amendment was adopted as a part of the original report.

The CHAIRMAN: The Report of the Executive Committee is in the hands of the Secretary. I will make note of the amendment and call it to his attention.

We are through with the program for the afternoon. Inasmuch as we are through with the program for this afternoon, it might, perhaps, be as well for us to adjourn and take a little time for looking around in the various departments from which we have had invitations to visit, and also others in which we are interested.

MR. HERR: Has the Memorial Committee reported?

The CHAIRMAN: No, sir; are any of the Committees ready to report? It appears not.

The Chairman wishes to suggest that we have quite a large program for the evening, and if you do not wish to adjourn we can take up some of the matters of the evening.

PROF. WATTS: I have a matter in my heart that I would like to speak to you about. As I look over the room I see a great many old, familiar faces, and I know you are the friends of Pennsylvania State College. As you probably know, I am connected with the Horticultural Department. Things are getting pretty crowded up there. We have about 450 students at present. 210 of these men are studying horticulture. We have no facilities to speak of for this horticultural work. We want more class rooms, larger classes, more offices, greater facilities in every way. At the two last sessions of the Legislature an appropriation for the horticultural building headed the list in the bill for the State College. Now, I don't know that the College will ask for the horticultural building this winter, because it is a matter for the trustees' action; but I assume that as the trustees asked for the horticultural building for two previous sessions that it will head the bill this winter. The only thing we want to ask is that every man here will turn in and work for that building, to get a horticultural building or anything else we need at the College. I am interested in the whole College, especially the horticultural building. I do not know what we are going to do. The boys are coming there by hundreds. So I simply want to request that those of you who are friends of the College, and I think I can count on all of you, will go back home to do what you can for our agricultural and horticultural work at the Pennsylvania State College.

The CHAIRMAN: What is the further pleasure of the Board at this time? Will we take up any other matters?

DEPUTY SECRETARY MARTIN: The Board, you will remember, was invited to visit the Chemical Laboratory of the Feeding Stuffs Division by Mr. Hutchison, and if you, in your wisdom, conclude to adjourn, whilst the hour is getting late, I feel that you will be made comfortable and gratefully received there as well as in all offices of the Department. Your visits thus far to these Divisions have been brief or limited, and if you feel that interest to visit this laboratory and other divisions of the Department, I assure you you will be given a hearty welcome.

MR. FENSTERMAKER: I move we adjourn.

The motion was seconded and agreed to.

Thursday Evening, 7:30 P. M.

Third Vice-President Blyholder in the Chair.

The CHAIRMAN: The Board will please come to order. The business of this evening is the continuation of the Reports. The first is the Report of the Apiarist, H. C. Klinger, Liverpool, Pa.

MR. KLINGER: Mr. Chairman and Members of the Board of Agriculture, Ladies and Gentlemen: My subjects usually have points to them. As far as my report is concerned, it is brief. If it lacks in any points I trust that you will, after I have read the report, ask me questions and I will be glad to answer if I can; if not, I will confess that I am unable.

Mr. Klinger then presented his report, as follows:

REPORT OF THE APIARIST.

By H. C. KLINGER, *Liverpool, Pa.*

The year just passed has been full of interest to the bee-keeping world. This may, perhaps, always be said, for there is no avocation connected with tilling of the soil or any other occupation or profession that affords a keener pleasure or deeper interest than that of keeping bees. And yet there may be some of us who have bees about us and derive neither pleasure nor profit from them. To such they appear as they did to the one who wrote:

"A little bee
Sat on a wall;
And it did buzz,
And that was all."

PRODUCT OF THE APIARY.

Perhaps one of the things of most importance is the condition of the year's product of the apiary. Reports from all over the State and, in fact, the whole United States, are that the crop has been below the average in quantity and very much below in quality. Colonies came from their winter quarters in fair condition and with no great percentage of loss. Brood rearing began in time and prospects showed fair for a good crop of honey. The white clover season had hardly set in when the drought began and continued throughout the summer.

The crop of honey of a good quality was small. The season was remarkable for the abundance of honey dew. Even when blossoms were abundant the bees would forsake them and betake themselves to the woods and gather the "Heavenly dew," as some prefer to call it, in preference to the nectar in the flowers. Owing to the continued drought, nearly all the honey was mixed with the "dew," ranging from 10 to 90 per cent. of the latter. This product is usually of a darker color and poorer flavor than pure honey, differing, however, with the locality. Some of it is clear and of a fair flavor, whilst most of it is of poor quality and of a muddy, greenish color.

Honey dew is not an uncommon phenomenon. It occurs once every few years, but only once in about twenty-five years in such large quantities. It is not honey, and according to the food laws can not be sold as such. Honey is the secretion of nectar from the blossoms of plants. Honey dew is either a secretion from the leaves of trees and plants or a secretion from the glands of plant lice, known as aphides, and sometimes from both. It is always inferior to honey and should not be placed on the market and sold as such, for its sale will injure the market for good honey.

It is not even a good food on which to winter bees. It contains such a large percentage of waste matter that when bees are confined for weeks and sometimes months without a flight it is likely to cause dysentery and loss of the colony. There is great fear entertained by apiarists that there will be a large loss this spring because the winter stores largely consist of this "dew." It is best to extract it in early fall and feed sugar syrup for winter stores. The "dew" may be fed in the spring to stimulate brood-rearing or later on for comb-building, for which purpose it is as good as any other honey or syrup.

BEE DISEASES.

The other subject which is demanding the attention of every bee-keeper is that of bee diseases. Very little notice is frequently taken when a colony dies as to the cause, even if the disease is deadly contagious and contaminates every colony "on the place."

There are two diseases which are prevalent all over the United States, and within the last few years have been spreading considerably in this State, that of European and American foul-brood. These diseases are caused by germs which attack the larvae in the cells, after which the larvae dies and decays. An infected colony becomes weakened and discouraged, and as bees are disposed to rob during a dearth of honey, such colonies are not in a condition to defend themselves; and as the germs of the disease reside in the honey, they can be scattered over an entire apiary in a few days.

The Bureau of Entomology of the United States Department of Agriculture has been making investigations of the diseases and found them more widespread than usually supposed. The results of these investigations are largely due to the untiring work of Dr. E. F. Phillips, who took up the task as soon as he took charge of the bee-keeping work of the Bureau. During the last year thousands of circulars were sent to all parts of the United States asking for samples of the diseases. Over 600 samples were sent in and bacteriologically examined, bringing the number of cases now up to over 1,000. Dr. Phillips prepared a map showing the infected districts of the United

States and, coming to our State during our last Annual Bee-Keepers' Convention, he showed a map of Pennsylvania with the counties where the diseases prevail marked in colors. One or the other of the diseases is found in about one out of every four counties of the State, and sometimes both prevail. Fearful to say, the result of this investigation does not yet determine that the counties not marked are not infected now, nor long to be immune, since the diseased districts are all around those not marked and which may at this time be free from it.

The following states and territories now have laws for inspection of apiaries: California, Colorado, Connecticut, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Nebraska, Nevada, New Mexico, New York, Ohio, Oregon, South Dakota, Tennessee, Utah, Washington and Wisconsin. Some of the islands and European countries have similar laws.

A unmber of other states, among which is our own, have made efforts to have laws passed for the inspection of apiaries, but have failed. The spread of these diseases, if not controlled, is bound to "put out of business" the bee-keepers of this State. It will require a vigorous campaign of education coupled with a law providing for a State Inspector of Apiaries, whose duties will be to instruct and assist bee-keepers in treating the diseases. Pennsylvania has almost unlimited resources in her bee-keeping interests, but even to maintain her present position among the States it requires organized and united efforts and eternal vigilance.

The CHAIRMAN: Gentlemen, you have heard the report. What action will you take?

On motion it was received and filed for publication with the proceedings.

The CHAIRMAN: Are there any questions or remarks.

MR. KLINGER: Gentlemen, a number of you may be bee-keepers, and if you are not bee-keepers there is no reason why you should not be bee-keepers. In my last year's report—although I suppose it was not read and did not reach the hands of the Secretary in time—I made mention to you of the reasons why every farmer ought to be a bee-keeper, how closely it is allied to the farming interests, to every man who has a fruit tree. There is no insect that is of as much benefit to the farmer as the bee in the fertilization of the fruit blossoms. Aside from that, he can reap a reward on the other hand in the crop of honey.

But, my friends, with the spread of these diseases and without any safeguards at all in this State except what the Bureau of Entomology in Washington is now doing in trying to locate the districts in which the disease is and help with their limited force as well as they can, there is nothing that will prevent these diseases from spreading, and if nothing is done, if we cannot have any laws passed in this State that will help us out in this matter, the time will not be far distant when we will be entirely out of the business. We have been making efforts a number of years to have that passed, and I am sorry to say, from information received, that one of our number, who should have been a friend to the bee-keepers, on account, per-

haps, of not receiving an appointment on a certain committee, when the bill was before the Legislature came and said there was no need for having such a law, the cause of his antagonism being the failure to receive an appointment on some committee which he desired to be placed on in the Bee-keepers Convention. It will be necessary that we do something, and I am really looking to this Board to do all they can in their power to help us out along this line.

Texas lately has appropriated the sum of $3,000 for the suppression of these diseases. Other states are doing a great work in it. Wisconsin has had a State Inspector of Apiaries for thirteen years. They have the disease in this state. You might, perhaps, think that the State Inspector would have been, in this case, able to suppress the disease or cure the disease; but as an analogy to that, we have the tuberculosis in the human family, and we have the scale in horticultural work, and although we cannot clean all that out, we still must do the best we can to suppress these, and we must do the same thing for the bee-keeper.

MR. GEARHART: What do you know about the codling moth; to prevent it, and remedies?

MR. KLINGER: The best is to spray with an insecticide and turn hogs into the orchard to get the fallen fruit.

MR. GEARHART: Do you never have trouble with it getting into your bees and eating them up?

MR. KLINGER: The moth that is likely to get into the bee-hive is not the codling moth. It is called the wax moth. No; I have never had any trouble, and I don't think there is likely to be any trouble with any bee-keeper who keeps his colonies strong. Any strong colony will fight these. When a colony has lost its queen, then they overtake them, and then infest the colonies. A strong colony will fight them. I have never worried about the moth.

MR. GEARHART: I have lost quite a good number.

MR. KLINGER: I have lost some, but they are simply a consequence of an infected colony, a colony that is infected by the disease, or that has lost its queen or reduced its numbers otherwise.

MR. RODGERS: My neighbor is troubled with the black ants annoying his hives. Is there any remedy to prevent that, and what do you do?

MR. KLINGER: I think, perhaps, the same thing is true with the ants as with the moths. The bees will likely keep the ants out, too, if the colony is all right. If there is an ant hill close to the hive, it is a good thing to kill the ants. They do that in the springtime when there is a cover on the hives, and after that is taken off and the top put on they seldom annoy them very much. They may annoy a colony that has been reduced the same as with the wax moth.

MR. STOUT: Just a word on this bee question. I am a novice in this business of about thirty years practice and have had some experience on various lines and perhaps I can clear up some questions asked about the bee moth and the ants.

These bee moths are usually in neglected apiaries. If a colony dies and that hive is left to stand during the Spring and Summer they infest it; a large number, and, of course, they multiply rapidly. I do not know how many thousands they may be. I have seen on hives standing around that way that were literally full of them, thousands of them. That is the time to destroy them and not have any comb standing around in empty hives during the Spring or Summer months. Melt them up into wax.

And the ants, in my experience, never did injury to the bees at all. They build their homes in the carpet or cover on the hives and that is all they disturb the bees; only when you open the hives some of the ants will drop in and pinch the bees and get them mad. They are not injurious at all.

The CHAIRMAN: The next on the program is the Report of the Geologist, Dr. Isaac A. Harvey, Lock Haven, Pa.

Dr. Harvey then presented his report, as follows:

REPORT OF GEOLOGIST. No. 1.

By DR. ISAAC A. HARVEY, *Lock Haven, Pa.*

With an experience of twenty-eight years in practical geology, I am prone to magnify my profession, in this sense at least, that its influence upon the spirit of its votaries, having an intelligent conception of its province and uses, is inspiring and uplifting. Indulge me in the expression of this much egotism: that, as a graduate, practically, in the ministry and law, with a very wide reading in medicine, as a physician's son, I am free to say that the attainment of a practical and efficient knowledge of geology is quite as difficult and exacting as that of the other professions named; and while the gospel minister has some security in his calling from mountebank preachers and tyros and cranks; the doctor is protected by adequate laws from the aggressions and impostures of quacks, empirists and charlatans, and the lawyer has his safeguard in the legal restraints upon the pretender and self-styled and self-constituted attorney, yet it is true that competent and well accredited geologists and mineralogists (as well as engineers) have no protection from the imposition of fakirs, who, with their hammers and pick and shovel, offend the honesty and dignity of the name they assume as geologists or mineralogists and dupe, deceive and mislead the farmer and others, who possess only a vague and obscure notion of the geological idea; and these same fakirs, wild, perverted and erratic, bleareyed and blatant, ofttimes, too, as truthless as they are toothless, practice their game of fraud and deception upon the credulous land owner and persuade him that his property contains, perchance, coal or clay, copper or iron, or even gold or silver, in fabulous values, and which will be disclosed if only the said owner will fee the human hyena for scenting out or opening up to the farmer or other land owner the possibilities of his hitherto unsuspected or unknown riches. Thus, the farmer, more

than any one else, becomes the victim and is swindled, and his money and labor are expended in a vain seach for minerals in rocks that cannot possibly contain them; and in outlandish places he digs, say for coal or clay or other deposits, where he might as wisely dig for poke-root or potatoes.

Last year a farmer came to me and, in his credulous manner, explained the theory propounded to him and his brother, that the precious metals, as well as coal, were to be revealed on their farms upon which the exposures, as I know them, were the black shale of the Hudson River and Utica formation, and the Lower Silurian limestone; and that these facts were revealed to them by a certain geologist that came that way. I admonished him to be guarded, and told him to send the geologist to me and I would tie him up in half an hour, while, in reality, the sheriff ought to handcuff him; but the stranger succeeded in filching out of those poor men $300 or $400 without showing anything of value. And so it goes all over the State. The Pennsylvania Society of Engineers, of which I am a member, is considering a memorial to the Assembly towards an enactment to protect the people from such thieves and impostors by requiring some credential or certificate as evidence of competency from every engineer, geologist or mineralogist, so-called, and thus avert this oft repeated deception. I know of farmers that have been duped and lost their farms by the expenses incurred in developing the carbonaceous shale and slate of the Number III formation, known as the Hudson River shale and slate, under the impression that they would eventually find anthracite coal. Such people certainly deserve some protection or safeguard from this criminal class, for such they are.

Clay is any rocky substance that, being ground or pulverized fine and mixed with water may be molded into any shape. The clays of Pennsylvania are of wide and diversified value and interest in their various forms and deposits. As classified by me, upon the basis of my own experience, they are as follows:

Hard or flint clay, adapted to refractory brick for furnaces and kindred uses; semi-hard clays, of rocky structure, but less compact and firm than the hard or flint clays; soft clay, a rather indefinite term as usually employed, since it thus comprises all the clays that have not the flinty hardness and absolutely rocky structure of quartz or feldspar, from the latter of which much clay is derived by weathering or disintegration. My term of soft clay includes such as have a semi-firm or tough structure, while not as firm as the semi-hard clay and yet more compact than the plastic clay which constitutes, in my view, all such clays as, without previous manipulation or grinding, may readily be molded into the several shapes required, being already moist, without mixing with water. It is one thing to be a clay man, as I replied to a certain State Senator who applied the term to me; but quite another thing to be a putty man. The several clay deposits may only disclose their actual utility by analyses and experiment, and, doubtless, many of the local deposits on your farms, of a plastic or semi-hard nature, would be found of some value if you had them properly tested; as much of the imported clay could be replaced by the output of such domestic deposits, if the same were investigated.

I remark here that our hard or flint clay, so much esteemed for furnace brick, is found only in local deposits; being, for the most part, beneath the A or Brookville Coal seam, at intervals varying from 0 to 40 or 50 feet, and in this era in brick making, no other deposit can replace it or afford the same durable product of fire brick, at least by the methods of manufacture practiced here and now in vogue, yet some of the floor clays of the other coal seams, in very limited area or extent, have afforded satisfactory results. I have noticed the comparative qualities of our clays and those now in use in England, Scotland and on the continent, and it is noteworthy that our refractory brick clays surpass foreign clays in their per cent. of alumina, which is the desirable and important element of the clays mostly used; the alumina, of course, being the cementing or bonding quality of the fire brick. ikewise, the European clays are higher in silica or sand. Thus we claim and use a better grade of clay on the average, because, upon our basis, the aluminous clays are superior. This difference is an excess of five to eight per cent. of alumina in our clay, as used for furnace brick, and the same excess of silica in the foreign clay. Now we have immense deposits of clay that analyze the same as European clay; that is, lower in alumina and higher in silica than the clays we are now using; and while some of these are used incidentally and applied to various purposes in furnaces and rolling mills, yet for the most part they are discarded, as, for the time at least, without value; just like our first lumber operations cast aside timber that latterly has proved valuable and the certain coal beds and areas, that formerly were left alone, are now being mined and utilized. We will soon have to come down to the same basis as other nations in the application and uses of our clays, and when the flint clay, representing the one deposit beneath the coal seam, shall be depleted, we shall be compelled to experiment until we can use the clays in wide acreage that are now recognized in the fire brick plants; but are quite as good as many European clays that are applied to the most exacting demands of steel and iron making.

The cement industry is a marvel of growth, and no possible or conjectural idea can be suggested as to its progress in the future. Many a time the farmer has complained to me in years agone that he had a species of limestone on his farm, perchance, dark gray or bluish gray, of block or shaly structure, or even conchoidal in its fracture, and he tried to make quicklime out of it. It burned into grayish blocks and dust and he scattered it over his field, and, much to his disgust, it formed into hard lumps like cement and would not dissolve; so that he was at a loss to know why his limestone could not be used for fertilizing purposes. By analysis it shows a low per cent., comparatively, of lime, with an admixture of five or ten per cent. of alumina and fifteen or thirty per cent. of silica; so that his limestone is of a mongrel or bastard nature, so-called a few years ago, but now dignified by the name of a natural cement rock or limestone and, perhaps, requiring only an addition of twenty or forty per cent. of pure limestone and some slight increase in alumina or silica to make a typical grade of Portland cement; as the native cement rocks do not produce the most valuable commercial cement, as, for instance, in the Lehigh Valley, an additional ingredient of higher grade limestone is supplied to the native cement rock to yield the admirable results thus realized in the shape of first-class Portland cement.

The range of composition in Portland cement mixture, which I quote from a West Virgina report, is about as follows:

	Min. Per Cent.	Max. Per Cent.
Silicia,	19	26
Alumina,	4	10
Iron,	2	5
Lime,	58	67
Magnesia,	0	5
Sulphuric acid,	0	2.5
Alkalis,	0	2.8

A certain limestone near Lock Haven, being assigned to the Marcellus formation, shows this analysis:

Silicia,	22.64
Alumina,	6.72
Iron oxide,	2.96
Lime,	36.64
Magnesia,	2.02
Loss by red heat,	29.42

This shows a quality of native cement rock which would produce Portland cement by the addition of twenty-five to thirty per cent. of high grade limestone. I note also that a German product is made upon this formula: One part each of silica, alumina and iron and one and seven-tenths parts of lime, which seems to be a wide digression from the formula usually applied in this country.

So, from the highest limestone, of a few feet in thickness, in the Upper Barren Measures, in Greene and Washington counties, down to our Lower Silurian Limestones, the Trenton, Chazy and Calciferons, we have various possibilities of cement, either in the local changes that these limestones undergo, from place to place, or in the various interleaved layers that are associated with these limestones and which we know as bastard or shaly limestone, but latterly termed cement rock.

The list is as follows:

Limestones in the Upper Barren Measures.

Limestones in the Upper Productive Coal Measures.

Limestones in the Lower Barren Measures.

Limestones in the Lower Productive Coal Measures, comprising the two Freeport Limestones, the Johnstown Cement Limestone and the Ferriferous Limestone.

The Mountain Limestone, at the base of the Pocono Sandstone.

The Helderberg Limestone.

Limestone in the Marcellus Formation.

The Clinton Limestone.

The Lower Silurian Limestones, the Trenton, Chazy and Calciferous.

From many, or all of these, may be derived, either locally or generally, some good native cement rock. So you will be wise if you keep advised of the progress and demands of the Cement Industry and notice your limestone formations. This cement business is

hardly more than in its inception or initiative, and the vast structural works that have been completed, with others in progress, and wonderous bridges, buildings and other improvements in contemplation upon the concrete idea, which, of course, requires cement. Be on the alert in these things, as you should be in many other things, and don't be deceived, but learn expediency and wisdom by past experience. What you have is your own, and your indolence or indifference may lose much of value by the device of the fakir, crank, the impostor or the unscrupulous speculator.

I touch briefly on "Tenantry," which, even admitting its wisdom and entire propriety under certain favorable conditions, yet in its broadest aspect, in city, town and country, it is a nation's sorrow and tends much toward a nation's undoing. The necessity for tenantry, broadly speaking, arises more from the erratic, commercial idea and unjust practices along general business lines than from any other cause. The old-time farmer was far happier in his ownership of the farm home and, with his neighbors of the same social, financial and religious spirit and status; but the slipping away of the farm and its replacement by an enforced tenantry is a menace that savors of semi-slavery or serfdom, and applying as well to the city as to country, having indeed a semblance of the old feudal system. I do not reflect upon the well-to-do farmer, who feels compelled to rent his farm or employ a tenant; but the prevalent usage and application of this idea has shown a decline in self-respect and a depletion or enervation of those positive, patriotic and moral energies that formerly characterized the farmer and molded his life. In a general sense tenantry nowadays is the genesis of national discontent, unrest, distrust and doubt. With these results are, also, the deplorable decline and changes in social life; sad enough, and that betoken only the dull, hard, monotonous routine that is prescribed for many, many of these people that cannot own a home either in city or country; and from this spirit arises bitterness and resentment and the sense of ownership will steal into the mind and ideas of the tenant and, realizing his comparative helplessness, such a conviction or notion is most readily distorted into a species of socialism, communism or, indeed, anarchism. Tenantry as a recourse or expedient should be the exception; the farmer on his own farm the rule.

There are corners in nearly everything and ultimately in corn, cotton, coal, coke, cement; corners in everything except Christianity; and trusts in everything but a wise and reasonable trust in the Gospel and Jehovah. Is this a re-enactment of the history of ancient Rome with its aristocracy and its follies? Of its comedy and then tragedy? While you are striving in the direction of good, worshipping, I trust, with righteousness and blessing, devotion and praise towards the Holy City, do not forget the duty devolving upon you to sustain alike the integrity of the Gospel and the National Union. "For the perpetuity of the American Union," said Governor Shunk, "depends upon the virtue and intelligence of the people." "Ye are the salt of the earth," and whatever may be your faults, follies or frailties, it is to be devoutly wished that your perception of right and wrong may never be so far perverted, your discernment of good and evil and justice, so far distorted, your natural kindness of heart, your benevolence and exalted patriotism so far blunted or your manhood so far undone that it will permit you to apply those iniquitous devices that

you have so often seen used and employed by others to effect their ends in exigencies and demands less stern, less relentless and less exacting than have been some of your own in this world. You exert a powerful influence in civic affairs and are still quite potent when your energies are directly applied; for eliminate the farmer from the great national system, remove him as an influence with the moral force that he commands, and, with due respect to the many noble people of other classes, there will not remain enough of moral stamina and honest patriotism and love of country to sustain our nation through its possible ordeals or against the gigantic evils and corruption that menace the nation's life. You do not abuse your trust, but you resist the abuses. You do not impose false values, but you give true and actual values. You do not produce schemers and have no school for graft or commercialism, rapacious and inhuman. The error and iniquity, gross and malevolent, may be perpetuated by others away from the farm and the rural districts; the redemption, if there be any, may be secured by the moral spirit and energy of the farmer. I believe in the higher patriotism and the higher pantheism, but I do not believe in the higher criticism, derived from the devotees of a vague, wavering, uncertain and obstructed science; science, in this sense, falsely so-called, within its narrow limitations and borders, producing everything in theory, even a new religion; but devoid of broad, active, vivid humanity and as a rule destitute of versatile scholarship.

I believe that the ideal Republic and the exemplary Commonwealth can only be secured, realized and enjoyed under the guidance and the fostering potency and influence of the ideal religion, namely, the Gospel of Jesus Christ. There is something not entirely bright and promising in our dominance as a financial and business power in the broad world's contemplation; for this lurid commercial splendor of ours, gleaming away across the waters, flushing and flashing the Western horizon, to inspire the wonder and amazement of the great nations, and achieved, measurably, in wrong and injustice, may be but the glowing forecast of a great nation's calamity, the brilliant and glittering token of a great nation's ultimate dissolution; the gilded index of a far-reaching ruin; for, as I said in a prior address, a nation that accepts not the logic of law and love will get the logic of lightning. When we study history and revert to the past century, the one noble figure supreme and singular in its grandeur and glory is Abraham Lincoln, big-brained, big-handed, big-hearted and with a great big honesty of purpose; the first champion of rights of that century, one of God's own; for God has his own and we know them, and whose example and admonition should be as potent to-day as in the sixties.

What afflatus or impact from Heaven or from its intelligence was vouchsafed to him as a sustaining, indeed, a sanctifying influence through the trying ordeal and relentless spirit of the great war; and did he hear the ominous voice of Jehovah as of old, "Let my people go." The spectre of slavery hovering over the flag, is it so now? With its stain and stigma of dishonor and unreason and injustice upon its folds was to Lincoln a certain harbinger of a nation's destruction or everlasting severance; and the menace that came from Heaven in response to the prayers of suffering millions, not only in bodily bondage, but in moral and political bondage, an admonition of punishment for a nation's broken compact with the Almighty, "Let my people

go." Was some edict or assurance from Deity sent to Lincoln's heavy heart "My grace is sufficient for thee." When the sky was overcast with sullen, somber, leaden clouds, weaving, waving, wreathing, rolling and folding, as though in futile conflict; the cumulus, cirrhus, stratus and nimbus and with scarcely a gleam or trace of light, was an assurance of hope, a promise of beauty beyond, given to him and to his storm-tossed soul, was it granted to discern through these gloomy clouds, parting, as by the fiat of Jehovah, to behold, I say, the Light of the World, radiant with the spirit of eternal mercy, love and truth, the supernal glory of the Son of God.

Did he not then and there for his country then and forever enter into a new compact with the Creator, to do His will. The years that approach us are full of tense and earnest meaning for us as a nation, and as Ruskin has said, "The evils with which we have to contend are increasing like the letting out of water." Yet there is a certain, if, indeed, somewhat dormant and latent patriotism, a vivid love of country and reserve, moral force and energy abiding in the minds and spirits of the American people, and intensely so, in the rural districts, that are an absolute assurance of the safety and permanence of our government and our institutions; but these energies for good must be exerted towards the suppression of great national evils and the firm establishment of benevolence, replacing or abrogating, every aspect of false and fabulous business; and with the prevalence of this idea, thought and motive everywhere abounding in the hearts of the people and exercised rightly, the world of mankind may view across the ocean the light and radiance of a new national purpose in the Gospel; our illogical attitude of plausible defense for our vulnerable faults and moral inconsistencies whereby we have many years incurred the just censure of other nations may be resolved into a God given determination to lead all the nations to a higher thought than rabid commercialism and Godless materialism; and ere many years pass the peoples across the waters may behold a new habinger of a world's redemption and the glory of Mount Zion rising in the West.

The CHAIRMAN: You have heard the report. What action will you take?

On motion the report was received and filed for publication in the proceedings.

The CHAIRMAN: The next thing is the Report of the other Geologist, W. H. Stout, Pinegrove, Pa.

MR. STOUT: Mr. Chairman, Ladies and Gentlemen: I think, perhaps, you will have a surfeit of geology before you get through with this paper. I am sorry I have to follow such a good paper as presented by my associate.

This I have observed in my own county and in Monroe county, machinery standing around in several places to drill for oil, and in one instance they asked me the possibility of getting oil, and I said I wanted the first barrel of oil they got and would give them a good price for it, but I didn't have to buy any. They even hunt gold and silver in some sections where it is not possible for it to exist. These are facts which I know from personal observation.

Mr. Stout then presented his report as follows:

REPORT OF THE GEOLOGIST. No. 2.

By W. H. STOUT, *Pinegrove, Pa.*

Until within comparatively recent time a huge octopus held in its grasp the minds and bodies of the human race. The tentacles of this devil-fish were numerous and may be designated as ignorance, tradition, superstition, fraud, ostracism, personal punishment, damnation. Since Copernicus, Galileo, LaConte, Spencer, Proctor, Hugh Miller, Lyell, Tyndell, Liebig, Newton, Harvey, Huxley, Darwin and their disciples have loosened the hold of the octopus one by one, the mind of man can feel free to give expression to honest conviction, free thought, free speech and science freed from bondage.

Geology especially was considered a dangerous heresy, but through modern teaching in educational institutions it has gradually gained a firmer footing, but even yet has not become as popular as it deserves, and by some persons looked upon with suspicion. As related to agriculture, geology is of first importance, but the time of fifteen minutes allotted to each speaker permits reference only to a few thoughts on this important subject somewhat epigrammatically.

A few things observed and gleaned from publications: That this earth has passed through many changes; that oceans and continents have been alternately changed; that continents are being levelled and sea levels changing; that upheavals and depressions have been in operation for time indefinite; that the same conditions prevail now is evidenced in earthquakes and volcanic eruptions; that the earth will eventually become uninhabitable; that the elements of fertility are largely derived from organic plant and animal life in seas and on land.

During the ages past, from the tiniest lichen spores to the successive and higher organized plants, forests, insects and animals lived and perished, leaving their remains to the disintegrated rock particles, forming soil from which all life obtains sustenance. How many generations of people lived during prehistoric periods may never be known; relics of the stone age alone affording any evidence of former races. Due to climatic changes there were alternate tropical, frigid and temperate conditions around us. The fossils found in coal and plant remains in the Arctic Circle are evidence that the climate has varied at different times, and the accumulation of later deposits upon the coal, of conglomerate, sandstone, limestone and shale thousands of feet in thickness is ample evidence of a succession of periods, during which seas and rivers prevailed over the earth.

The oceans relentlessly beating upon the shores, demolishing the granite and other rocks, forming gravel, sand and mud, to which is added the deposit of inland streams, afford in a measure a conception of what may have occurred during past periods when the hills and valleys now devoted to industry were in a formative stage. The streams and rivers are all charged with chemical elements constantly

removing the accumulated soil and, together with what is removed with crops, there is a steady drain on the stores of fertility so manifest on all sides that history may repeat itself and eventually a condition similar to that now found along the Euphrates, the Jordan and the Nile, where anciently fabulous populations maintained themselves on lands now unproductive, reduced to dearth and waste, largely given over to nomads and shiftless people; because the most useful of all resources of national importance were consumed in maintaining vast armies and an aristocracy that absorbed and devoured all the wealth yielded from the soil, until it can no longer claim the distinction once enjoyed of being the granary of the world, but a country exemplifying the beginning of an end when similar methods are pursued. The wealth of Croesus and Solomon did not save their countries from disintegration and ruin, neither will that of the enormously rich in this country yield any to the soil resources when once depleted.

Flowing from the West, eastward, an endless stream of the cream from the soil is moving to maintain this section, while in the near future the rapidly increasing population towards the Pacific will require all their products to provide for themselves; the corn and bran, linseed and cotton seed will be needed where produced, and the phosphates, nitrates and potash exhausted unless new deposits be found. If not, Eastern agriculture, with no new territory to develop, cannot be maintained. Then landlordism and a division into classes of rich and poor will be the final result in a more aggravated form than that already evidenced in the vicinity of towns and cities where it now is an established condition. Neither radium, diamonds, gold, silver or other precious metals will ever produce a loaf of bread. The accumulated fertility of the soil and that which may be obtained through disintegrating rocks alone can be depended upon to support life.

The several rock formations contain elements of fertility in various degrees, those of organic origin being most permanent, consisting principally of the limestone. The rich alluvial bottoms are formed at the expense of other localities from which streams flow carrying silica, lime, phosphorus, nitrates and potash in solution, and a fine sediment, retentive and friable; but these are limited in area to valleys. The granite and traps of igneous origin produce a soil rich in potash and other elements, but are slow to disintegrate and often too stony for cultivation. The various shales and sandy soils, upon which the soft woods and inferior plants grow naturally, are usually soon exhausted for want of inherent fertilizing elements. The herbage and forest growth is a certain indication of the natural fertility of the soil in the Eastern and Middle States. The soils of the Pacific coast states, parts of South America, the islands in the Pacific Ocean, of France, Italy and some other sections are of volcanic origin, once molten materials of lava, pumice and ashes, yielding some of the most productive land.

Viewing the eastern section of this country from the Allegheny Mountains it is evident that the earth, after the stratified rocks were deposited on horizontal plains, yielded to some force, internal or external, which forced these deposits thousands of feet in depth and thickness which are now found at all angles from the horizontal to

perpendicular. This disturbance was of such great magnitude and forceful enough to fault and crush under great pressure all the formations east of the Alleghenies. What the forces were that produced such dislocations is not definitely known, whether due to the shrinking of the earth in cooling or to volcanic eruptions or to both. The vast amount of ejected molten material drawn from some source far or near may have caused elevations in some places and depressions in others. West of the Allegheny Mountains and in sections where the rocks are in a horizontal position, not crushed and tilted as they are in eastern sections, the mineral oils and gases stored are hermetically sealed in porous rocks under clay deposits, remaining secure until tapped with drills.

Much time and money has been wasted prospecting for oil and gas in various localities where, on account of their volatile nature, these substances have long since escaped into air through faults and fissures produced during the shifting of the rocks. It may be worth remarking and remembering that in or near a section where displacements have occurred prospecting for oil and gas will be useless.

Gold, silver, copper and other precious metals usually occur among rocks of volcanic origin, granites and traps; this being, however, no indication that all rocks of this type contain metals of value.

There are published, in State and National geological reports, the results of many analyses of rocks and soils and, while interesting to study, they indicate what the chemist can find of the various useful substances necessary for plant production. Such results are of little practical value in agriculture, since the methods employed by plants differ so widely from those of the laboratory. The character of soil, the proper proportion of sand and clay with a few other elements and organic matter determine its agriculture value.

In reference to the climatic changes already mentioned, before the temperature of the continent became moderate and the land habitable there was a period of intense cold succeeding the tropical period during which the coal was formed. The Northern Hemisphere was covered with a great ice sheet, overtopping most of the high mountains to the north, reaching as far south as the 40th parallel near New York City, thence passing over New Jersey into Pennsylvania, trending westward in an irregular line across the continent, reaching the farthest southern point in Illinois on the 38th parallel, then passing north of the Dakotas and west to near British Columbia, thence to the Pacific Ocean and Alaska, where the glaciers yet exist, the same as around the pole, where Cook and Peary claim to have been. Darwin states that evidence was observed in the Cardilleran Mountains of South America that glaciers existed there at some period. Other writers mention New Zealand and Australia as having experienced similar conditions. Geike details observations in Scotland, Ireland, England, Scandinavia and Northern Europe, with a full description and maps of the glaciated districts in those countries. The Alpine district has been carefully studied and described by numerous visitors and Agassiz, from his observation and study in that locality, first explained to geologists of this country the cause of the drift, lakes and other evidence of a continental ice sheet. Since then, during recent years, attention has been given to the subject by many persons in many localities.

There is ample evidence that with a change of climate and the retreat of the glaciers the rivers flowed at much higher levels than at present, the river terraces indicating quite plainly where the floods reached. Here in Harrisburg, on Allison's Hill, sand, gravel and boulders, brought from a distance, are found on the surface and where excavations are made. The river here is 290 feet above tide, while Allison's Hill appears to be a hundred feet higher. Evidently when the river lowered its bed an obstruction was in its path at York Haven, where a trap dyke, hard granite, forced its way through the shale at that point, which passes from York county into Lancaster and on eastward, forming a barrier in the river, affording the river only a narrow channel and causing a natural dam, now used for electrical and other power, being one of the natural resources about which there is so much controversy.

It may be considered that some of the ideas contained in this paper are far-fetched and not related to agriculture, yet the farmers on the fertile limestone soils producing grain, as well as those who devote their energies to fruit on the granite and shale hills, and those who are in glaciated districts where dairying and fruit applies, realize the advantages afforded under the varied conditions created by natural agencies during the distant past. Editors, lecturers, and scientists who, when not engaged in practical farm work, look wise and devise and suggest methods for increased crop production without depleting soil fertility, and yet maintain an increasing population to consume the products of the soil without loss of fertility, are facing a condition and not a theory, a problem compared with the oft repeated impossibility of eating pudding and keeping it at the same time. Not until perpetual motion can be demonstrated will land be self-supporting when the products are removed, consumed and lost, will the soil become an Alladin's lamp.

The fact that the farmers of Pennsylvania spend seven million dollars a year for commercial fertilizers alone and as much more, perhaps, for manure and lime, if not necessary, would indicate that the farmers have not learned the first principles in agriculture, and would confirm, if true, the statement of Secretary of Agriclture Wilson when he states that "the worst farming in this country is done east of the Alleghenies, and agricultural land the cheapest in that locality in consequence."

The CHAIRMAN: You have heard the report. What action will you take on it?

On motion it was received and filed for publication with the proceedings.

The CHAIRMAN: The next on the program is the Report on Forests and Forestry, Hon. Robert Conklin, Harrisburg, Pa.

Mr. Conklin then presented his report as follows:

REPORT ON FORESTS AND FORESTRY.

By ROBERT CONKLIN, *Harrisburg, Pa.*

Gentlemen: Your Chairman on Forests and Forestry does not have a lengthy report to present. The State Department of Forestry has, during the past year, added 88,717 acres and 12 perches of land to its forest reserves, bringing the total area acquired to January 1, 1910, to 916,569 acres and 8 perches. The average cost of this land per acre was $2.23. In the care of the land it has 31 foresters and about 80 forest rangers employed, only about one-fifth of the number necessary to properly care for the area held; but it is necessary to live within the appropriations granted by the Legislature, therefore more cannot be employed.

The effort thus far in the care and improvement of the reserves has been in the surveying, making roads and fire lanes, doing some improvement, cutting and also planting the seedlings that were available from our nurseries. Last year there were planted nearly a million seedlings, mostly white pine. The other species planted were Scotch pine, larch, Norway spruce, oaks, walnut, hickory, ash, catalpa and Carolina poplar.

In our nurseries, located at Mount Alto, Greenwood Furnace and Asaph there are now about 5,700,000 young seedlings, of which 2,000,000 will be available for planting out this Spring. Each nursery will be enlarged this year in order that we may be able to comply with the provisions of the Act of Assembly passed at the last session, allowing the Department to furnish at cost to persons seedlings for individual planting. Upon a number of the reserves there has also been started by the foresters small nurseries for the purpose of raising young trees to be set out upon those reserves.

Thus far in this State there has been very little effort in the way of forest culture by the individual. Many inquiries have come to the Department during the past year, however, by individuals and corporations who are considering the matter of planting up their rough lands with forests, and I am in hopes that many of them will do so shortly. It would be a great pleasure to the Department if it were possible at once to supply them with the seedlings necessary to start the work. Every farm should have its woodlot, and there are few farms but what have an acre or more of land that is unprofitable for cultivation and which should be planted with trees. Every acre of land in the farm should produce a revenue, and if the rough land is put in trees, the crop produced will be as valuable, and probably more valuable, than any other crop that can be raised upon it.

There are thousands of acres of land in this State that are being neglected by the owner. He should turn his attention to this waste land at once and put it in trees it order that it may become a source of revenue to him. It was for the purpose of encouraging the individual that the Act granting the Department of Forestry the authority to furnish trees at cost was passed.

Forest fires were very destructive during the past two years because of the drouth that prevailed. If it were possible I should like to see a law passed that would make the penalty for setting fire to timber land life imprisonment. The fiend who puts a match to the leaves in a forest can destroy by that single act property that is more valuable than the amount he can earn at his vocation in his lifetime. The fire is the forest's worst enemy we have to-day and to prevent it should be the effort of every good citizen. We find that many of the fires that are started come by reason of the farmers burning over their new lands. I don't want to say that I would like to have that penalty attach to the man who does it in that way; but the farmer should be very careful when burning new land and not let the fire escape him. There has been during the past year a number of destructive fires that were caused by the carelessness or neglect of the man who was burning his new land.

I want to say also that the Department would be glad to have applications from farmers who have an acre or two of the rough land that they desire to plant up, in order that we may file them and be prepared to ship to them such trees as they will need. The cost of these trees will be probably about $2.75 a thousand for conifers and hard wood and broad leaf trees will be a little less than that. Just exactly what the cost will be we cannot determine as yet. We shall be glad to encourage the farmer in planting up the little pieces of rough land that he has on his farm. If he has only half or a quarter of an acre, let him put it in trees. It is going to produce something. It is not worth much for anything else, and in that way he will be getting a revenue for his land.

The CHAIRMAN You have heard the report. What action will you take upon it?

On motion it was received and filed for publication with the proceedings.

The CHAIRMAN: Is Prof. Cochran, the Microscopist and Hygienist of the Board, present, or is his report present? There seems to be no reply.

Is the Mineralogist, Mr. Silas R. Eshelman, present or is his report here? There seems to be no reply.

Is there any discussion on the reports you have heard this evening?

MR. RODGERS: I saw there were a couple of reports in the batch of papers committed to the Committee on Credentials. I handed them back to Secretary Critchfield and I don't know what he did with them.

The CHAIRMAN: The next then on the program is, "Choosing a Vocation and What Became of It," by D. W. Lee, of Bedford, Pa.

Mr. Lee then presented the following paper:

CHOOSING A VOCATION AND WHAT CAME OF IT.

By D. W. LEE, *Bedford, Pa.*

It has been said by James Russell Lowell that no man was born into the world whose work is not born with him. There is always work and tools to work withal for those who will, and blessed are the horny hands of toil. The busy world shoves angrily aside the man who stands with arms akimbo set until occasion tells him what to do, and he who waits to have his task marked out shall die and leave his errand unfulfilled; and each one as he comes to his task is expected to take it and march in the great procession of life and time as they pass along. And we believe that it makes a great difference whether we take it up cheerfully or otherwise, for we shall pass this way but once; therefore any good that we can do to make the world better or any kindness that we can show to any of our fellow-human beings let us do it as we pass along, for we shall not pass this way again. Let us take our occupation as we find it and let us follow it cheerfully and hopefully, giving to it our best powers and abilities, not entirely for our own selfish up-building or supporting, but that we may fill the place that we occupy in our own special locality and community to the end that it may be bettered by the life and work that we have been able to do in it; that truth and honesty, education and righteousness, may be the fruits of our efforts and lives and God, our Maker and Preserver, honored and glorified by them.

This matter of occupation is not a simple matter of choice with all of us. Necessity confronts most of us and compels us to earn our living by the sweat of our brows. Such is the commandment that God gave to our first parents when he drove them out of the Garden of Eden, and such is and has been the lot of most men ever since that time, except that God, in His love for His creatures, sent His only begotten Son into the world to condemn sin and by His suffering and death on the Cross to make atonement for the sins of our first parents and thereby bring us back into an estate of communion with Him; that is to say that by the death of Christ the bar or bars which divided between God our Creator and we his subjects was taken away, and so God now through our Lord Jesus Christ commands all men everywhere to be zealous in business, fervent in spirit, serving the Lord. He also promises great assistance, guidance and help to all who put their trust in Him and who continue faithful to the occupation that has come to them, giving it their best attention, to the end that their own condition in life may be bettered and that others may be cheered and comforted by their example.

Now, as we look over the field, we see men who, forty-five years ago, chose agriculture for an occupation and, not understanding the financial condition of the country at that time, bought farms at the then inflated prices caused by the great civil strife that had just ended, hoping that the prices of farm produce would still remain correspond-

ingly high until they would get out, many of them giving heavy mortgages on their investments, which afterwards became a great load to carry; for as the then inflated currency of the country rose from sixty cents on the dollar to one hundred cents, farms and farm produce depreciated in the same ratio, or even more, for a while until after the years of 1873 and 1874, and then, as most of us remember, for at least eighteen or twenty years the value of farm produce was very uncertain and values in other lines equally so, nothing but actual supply and demand helping the situation in the rural districts. Those were discouraging years for the Pennsylvania farmers, but with all the discouragements in the way, some pushed all the obstacles aside, paid off the mortgages and are still living on these same farms unencumbered and very much improved, in the meantime and at the same time found time to help with every progressive movement in their particular part of the country.

And now as we look over the field we think we see a grand and cheering prospect, for the future Pennsylvania is looking for her brightest and best sons to till her soils, real men of education, of strong physical bodies, with will power enough behind all to move them to doing the things necessary to keep her in the forefront of states, where she belongs, for no matter what she has done in the past, we still claim that she has not yet reached half her capacity in agricultural production. With her money values at par; with the Department of Agricultue to help in the way of institutes and movable schools of agriculture carried into nearly all the corners of the State; with our State College to educate and train in all special lines, free of tuition; with Grange organizations in a great many parts of the State to break down the isolation of the rural districts and help along social lines; with increased market demands and with better facilities of getting to market; shall she not have the best of talent and muscle to cultivate her hills and valleys? Let us hope.

And now we would like to invite our farmer friends to try and beautify a little, to put up little neater fences, to straighten up some of the little crooked streams that spoil some of our fields and spoil the beauty of the view. These things together brings success with the occupation which is the culmination of our effort.

The CHAIRMAN: You have heard the paper, gentlemen. What action will you take on it?

On motion this paper was received and filed for publication with the proceedings.

The CHAIRMAN: The next on the program is, "Animal Husbandry in Pennsylvania," by W. A. Cochel, State College. Is he present?

Prof. Cochel was present and delivered the following address:

ANIMAL HUSBANDRY IN PENNSYLVANIA.

By PROF. W. A. COCHEL, *State College, Pa.*

Members of the State Board of Agriculture, Ladies and Gentlemen: I may say that I feel that it is a very great honor to be asked to talk before the State Board of Agriculture on the subject of "Animal Husbandry in Pennsylvania." We only have a very short time to devote to this subject which, if we were to go into it in all of its details, is large enough and broad enough to occupy the whole evening; so I will only attempt to touch it in a few spots.

I may say, fankly, that this is my first public appearance, aside from being at State College, in the State of Pennsylvania. I have been away from here for about two generations. My grandfather and grandmother on my father's side were Pennsylvanians, so that only having been here personally for the last four or five weeks it is impossible to say so much that I can back up with actual observances in regard to Animal Husbandry in the State. I may say this, however, that the livestock history that has been taught me and the things that I have been able to learn from reading and observation in the West, have shown me that Pennsylvania was originally one of the greatest livestock states in the Union. The first marked improvement in cattle, in hogs and in sheep in the United States was accomplished in the State of Pennsylvania; but to-day when we consider Pennsylvania as a livestock state it does not really rank with some of the others in the Union. This is a peculiar condition. We are more nearly located to the great consuming centers of the United States than any other farming community in the world.

I will deal especially with the production of meat animals. There is more meat consumed in the states of Pennsylvania and New York than there is in any other three states in the United States; and yet in proportion to their area there is probably less meat produced. This has been brought about through two or three reasons. It is not because our country is not adapted to the production of livestock. It is repeatedly shown in every neighborhood that there is someone who has taken a fancy to meat-making animals and he is making a success of it. When our Western country was first settled, land was so cheap and produced such crops that they could not do much with them. They were far from market and isolated to some extent; and for that reason the meat-making animals enabled them to market their products in a more concentrated form. With land at two and a half to three dollars an acre in Illinois and Missouri, necessarily people who had lived here on the farms for a generation could not compete with these men in the production of meat animals. But to-day we find the same conditions confronting the people of the Central West that confronted this State one or two generations ago; that is, their lands have advanced so much in value that the farmer who is producing

beef in Illinois, Missouri, Kansas and Nebraska, the great meat-producing sections of the country, is not able, if he charges the market value of his crops and the cost of his cattle when he begins to feed them, all through to the finished product, to show a very great profit unless he considers the by-products, the manure and hogs, in maintaining and upbuilding the fertility of his soil. So that today, for the first time in the history of the country, the man who is making beef is really getting a little bit more than the cost of production, over and above the by-products of the feed lots; and as soon as that condition confronts us the first thing we have is a boycott on the meat, which the papers are full of to-day.

Present prices have been brought about by the inexorable law of supply and demand. We find from the period of 1880 to 1900 there was an increase in the population of the United States of 56 per cent.; in the same period there was an increase in the number of cattle produced of approximately 29 1-2 per cent. In other words, the population is growing more rapidly than the production of beef. Since 1900 it is estimated that our country has increased in population approximately 20 per cent., and in that same time there has been no increase in the production of meat-making animals, hence the present high prices of meat; that is, the demand has more than caught up with the supply. Whenever we get to that condition where we can make beef in Pennsylvania in competition with people who are on land just as valuable as ours, then we are getting to the place where we can go back into the production of meat.

The production of beef in any community, whether in Illinois, where they raise the greatest corn crops in the world, Indiana, Iowa, no matter where we take up the production of beef, we must consider it from the standpoint of the upbuilding and maintaining of the fertility of the soil, which is the greatest problem before the people of America. If we can consider our meat-making animals, machines for the marketing of crops, and secure through them as much for the crops and a little for labor, then we are making a large profit on the production of meat. That is the attitude that we are taking toward our experimental work in feeding at State College; we are striving to demonstrate means and methods by which we can obtain equally as much for the crops we feed to the farm animals as we can by selling them off the farm, and at the same time get a little profit for the labor necessary in feeding.

Having gone out of the production of beef for one or two generations in this section, there are two things for us to do in order to get back on a competitive basis with the people who are meeting the same conditions as we had a few years ago. In the first place, it is a matter of selecting an animal that will feed well, that will sell well after he is fed. If we have not been in the habit of selecting beef animals, the lard type of hogs and the mutton type of sheep, necessarily we will not be able to compete with the men who have grown up in that business unless we learn how to select them. The first essential of success is to learn what it takes to make the highest class market animal. The second thing is how to feed him, how to make out of him the highest market type with feeds available and at the same time secure the highest financial results. The question of selection of animals is one that we have a great many notions in regard to. As Dr. Armsby showed us last night, the pure-bred beef

steer does not digest his food better than the scrub, but that it takes less feed to maintain him in proportion to live weight, and his great advantage is in being able to consume more in proportion to his weight than the scrub animal. In other words, we ought to select animals expressly for feeding purposes, and that holds equally good in hogs, cattle and sheep. The more we can get an animal to eat above maintenance, the more production we will get and in that way cheapen the total cost of our finished animal.

The second great advantage offered by an animal that is bred for beef purposes in comparison with one bred for no purpose is, that it will dress out better and yield a higher proportion of the cuts of beef that bring the high prices on the market. The highest priced meat in beef lies above a line drawn from the point of the shoulder back, which includes ribs, the loin and upper part of the round and rump. The chuck ribs of the well finished steer are also good cuts. Below this line the plate, brisket and flank are cheap cuts. So that in selecting our beef animals, we want to have them carry as much back and loin and just as much of the high priced meat as we can in proportion to the cheap meat, and in that way we can get a higher price when we sell them. It costs more to produce cheap beef than it does the meat on the well-bred steer, and you will get less out of him than the well-bred steer. If you consider the problem from these two standpoints you can cheapen the product and there will necessarily be a greater percentage of profit.

The next point in the production of meat animals at the present time, is the selection of rations. During the past four years I have devoted my time to experimental work in feeding beef cattle. We have been able to show in our work that clover hay is worth one-half more per ton than timothy hay to feed to beef steers. We find that in Indiana there are more people feeding the timothy than clover hay to beef cattle. In the feeding of roughage, we have been able to show a marked improvement in the ration. We have been able to show that the use of cotton seed or linseed meal, these commercial concentrated feeding stuffs, has enabled us to get an increase of 5 to 15 cents per bushel for corn than when we fed similar rations without it.

We have also been able to show that silage is one of the most economical feeds for the production of beef. Intelligently fed it imparts a high market finish. That brings up in a very limited way just a few of the things that we expect to work on in this State, that is to try to determine the rations that we can select on our farms in Pennsylvania that will produce meat at the lowest possible expense and get the highest possible finish on the animals, the marketable finish that the market men are willing to pay for. In a measure, what is said in regard to beef cattle is true in regard to hogs and sheep; the same principles underlying. We want to select an animal that will produce what the market demands, and select feeds that will produce that animal at the lowest possible expense. We have a little different condition in feeding hogs than in cattle, however. Most of the hogs fed are farrowed on the farm where they are fed. There is not the traffic and dealing in stock hogs as in stock cattle, so that we have to consider every pound that that hog gains while he is on our farm when we sell him. With cattle we buy at four to four and a half cents a pound, when we feed them for three, four, five or six months, we expect to get a margin over and above the

cost of cattle, and unless we do there is no profit. With corn at seventy cents a bushel, a steer will have to increase in value thirty to forty-five cents per hundred every month fed. With a hog he has to make a pound at a lower cost than what he finally sells for. We are going to try to determine methods of management of hogs in order that we may keep them thrifty and healthy, and utilize to advantage the forage crops we grow on the farm. I feel confident in saying here to-night that if the farmers of Pennsylvania would utilize all of the land that is going to waste in the State at the present time, that is not returning an adequate profit in the growing of grass, clovers, alfalfa and other good crops, and would make an intelligent use of the feeds we have at hand by selecting supplements to the best possible advantage, that we can double the production of meat in the State of Pennsylvania to-day without any question whatever.

The question of horse production has been so thoroughly covered to-day and at your previous meeting that I will not touch upon it except in a limited way. I will say this, that we ought to produce in Pennsylvania every horse we use here, whether for carriage, road, draft or saddle purposes. We have a soil that is especially adapted to the production of horses, and the only thing necessary is to follow proper lines of breeding and we can produce horses equal to any we can ship in. I lately attended a sale of horses shipped in from the West that sold at an average of $226.00 per head, and there was not a sound horse in the bunch. Now, when such a condition as that confronts the farmers of Pennsylvania I do not see how they can afford to pay the prices for those horses to work on the farm when they can produce immensely better horses by following the same methods of breeding and management in production and save two or three profits from the middlemen and expenses of shipping, freight, etc., and risk from disease, all of which go in with the price of $226.00 for unsound horses. The thing we have to do in the horse business in this State is to decide in each community upon something that is adaptable to the community, some breed or type that has been agreed upon in that territory, and select registered stallions and build up the horse industry in the State. I believe in all the farm livestock we have there is a greater chance of improvement in horses and beef making animals than anything else in the State. The hogs are fairly good, the dairy cattle not excelled, and our chief endeavor will be to stimulate interest in the horse-producing and beef-feeding business. This may seem to you a rather broad field for a man to take, but with reference to this beef part of it especially, where the farmers have gone out of any line of business, it seems there is a good economical reason back of it. It may be there was, but the conditions in other states have changed so much, and the price of beef will always be higher than it has been in the past unless our country goes to the bad financially in every way. The time is ripe for us to make some improvement, start along new lines and breed up a lot of cattle that are useful for the purpose. We find the Western ranges supplying the State of Pennsylvania to-day with practically three-fourths of the cattle fed in the State, are gradually closing up, the steers in the West are getting to be worth more and more each year, and if any of you are feeding cattle, you know it is more difficult every year to get a load of uniform beef type that will make you

a profit in the feeding line. The quality of the cattle of the country as a whole is decreasing, the numbers decreasing and the prices increasing. When these three factors are brought together it means we can produce them in this section just as cheaply as they can in the West, and the man who begins now and starts in at the bottom is certainly going to get his reward.

There is a question that usually comes up when we discuss the relative merits of beef cattle; that is, why feed beef steers when we can buy dairy cows and make more money out of it. You undoubtedly can, but the question of labor is one we cannot get around, and the man who devotes his time exclusively to the dairying must depend upon hiring the labor he intends to use on the farm or limit his operations to a small scale; while on the other hand, the man who feeds beef cattle can market a large amount of crops on any one farm with little outside help, and this is the reason people in any section will go into the feeding of beef cattle instead of dairying; it is the relative amount of labor and hired outside help required which determines the matter. If we had all the labor we needed and could get it at a very reasonable price, there would be no use in the world of the beef man attempting to compete with the dairyman in the utilization of crops. But the conditions in Pennsylvania are the same as elsewhere. The boys are going to the city, off the farm, and then the father has to go out of the dairy business. We find also, in making a very careful study, that most every dairyman looks forward to the time when he will have accumulated enough to quit the business and not have to work the rest of his days at it, while the beef cattle man always looks forward to the time it will be possible to handle more cattle. He never looks forward to the time when he can quit. This is simply due to the difficulty encountered in securing labor for dairying.

The CHAIRMAN: This brings us now to the bottom of the program with the exception of hearing some reports of committees.

I will ask Mr. Gearhart to please come forward and take the Chair while we hear a short report from the Memorial Committee.

Mr. Gearhart in the Chair.

The CHAIRMAN: We will now hear the Report of the Memorial Committee, Mr. Blyholder, Chairman.

Mr. Blyholder then presented the Report of the Memorial Committee as follows:

REPORT OF THE MEMORIAL COMMITTEE.

S. M. McHENRY.

It is with sadness, yet it is proper and befitting that in the midst of our busy assemblage we pause and realize that the mysteries of life are beyond comprehension. This is very forcibly impressed upon us by the very sudden death of Brother S. M. McHenry, of Indiana county, Vice-President of this Board, and Brother R. F. Schwarz, of Monroe county, who was called to the Great Beyond from whence none ever return.

Brother McHenry was a member of this Board for many years, always laboring for the uplifting of manhood and womanhood; never willing to compromise truth; but ever willing to defend it. Quiet in disposition, careful and temperate in speech and action, charitable in judgment, patient and forbearing, loving peace, he was nevertheless firm, courageous and outspoken for what he believed was right, and always ready to deal with situations and conditions calling for action.

A dispenser of a generous and charming hospitality, he was an ideal head of an ideal family and social life, and his loss will be felt far beyond the circle of his church and immediate friends.

Brother McHenry raised a family of nineteen children, four of whom were called from life before their father, and fifteen are now living to mourn the death of a loving parent.

Brother S. M. McHenry departed this life April 22d, 1909, in his home in Indiana, Pa.

Resolved, That in the death of Brother S. M. McHenry, we have lost a true and faithful member; one who was always ready to respond to duty's call.

Resolved, That we extend to the bereaved wife and family our sincere sympathy and say to them, "Let not your hearts be troubled," but look to the Great Master above for comfort.

Resolved, That this report be spread upon the records of this meeting and a copy forwarded to the wife and family of the deceased.

R. F. SCHWARZ.

R. F. Schwarz, born at Anhalt, Germany, October 31, 1853, graduated from Dessan College, Germany, in 1869, afterwards taking a special course in Geneva, Switzerland. Then leaving this native land, coming to America, was employed as salesman in the City of New York. Being an apt student, he soon acquired the English language, afterwards located and did business in Chicago. In 1875 he purchased land in Monroe county, Pa., and conducted the business of market gardening along scientific lines. He served his county in the Legislature two terms; was a member of this Board and a lecturer on the Institute force for the Department of Agriculture.

In his death this Board has lost an able instructor, a wise counsellor and a willing defender of true manhood.

Resolved, That in the death of Brother R. F. Schwarz, we have lost a true and faithful member; one who was always ready to respond to duty's call.

Resolved, That we extend to the bereaved wife and family our sincere sympathy.

Resolved, That this report be spread upon the records of this meeting and a copy forwarded to the wife and family of the deceased.

DR. LEONARD PEARSON.

Resolved, That the State Board of Agriculture profoundly regrets the death of Dr. Leonard Pearson, late Veterinary Surgeon of this Board, and extend to the family of the deceased sincere condolence in their bereavement.

Resolved, That we are deeply conscious of the loss sustained by his death, and desire to bear witness of his sterling worth as a man, his integrity and ability as an official, and his courtesy and fidelity towards those with whom he was here associated.

Resolved, That these resolutions be spread upon the minutes, and that a copy, with the action of the Board, be forwarded to the family of the deceased by the Secretary of the Board.

S. S. BLYHOLDER,
Chairman,
M. P. SHOEMAKER,
MATTHEW RODGERS.

The CHAIRMAN: You have heard the report of this Committee. A motion would be in order to accept the report and spread it upon the minutes.

On motion the report was accepted and ordered spread upon the minutes.

Third Vice-President Blyholder in the Chair.

The CHAIRMAN: We are now ready to hear the Report of the Committee on Resolutions, Mr. Dorsett, Chairman.

MR. DORSETT: In accepting the Chairmanship of this important Committee, I feel somewhat like the man who had suddenly found himself rich through the death of an uncle. This man had lived rather a modest life, knew nothing of social life, and when this sudden wealth came to him his wife, as is usually the case, was very anxious that he should take his place or position in social life. So, in the course of a few days, weeks or months, a reception of some sort was to be given in the town and this man was invited to give a toast, He flatly refused, but his wife insisted, and so in order to keep peace in the family he finally consented to have his name printed on the program. When the eventful time arrived and he was called upon; he got up and sort of trembled, and he could not think of what he was going to say. His wife was sitting aside of him and kept punching him in the back, and finally turned around and said: "Ladies and

Gentlemen, this thing was thrust upon me." That is a great deal of the present case. This Chairmanship was thrust upon me at a very late hour and you will have to accept what you get. I say you don't have to. You may turn it down if you want to.

Mr. Dorsett then presented the Report of the Committee on Resolutions as follows:

REPORT OF THE COMMITTEE ON RESOLUTIONS.

We view with alarm the misleading reports that have been disseminated by the United States Department of Agriculture relative to the great prosperity of our farmers and the enormous crops which they are producing, believing that they are largely responsible for the unjust accusation that the farmers are forming a trust and increasing the cost of living.

We emphatically deny the charge that the farmers are getting exhorbitant prices for their produce, increased cost of labor and production being considered, and charge the increased cost of living to the parasitic middle-men, who come between the producer and the consumer, and the greedy methods which are resorted to by various trusts and monopolies. We further suggest the enactment of legislation that will prevent the gambling in food products or the combination of men and money to control prices, rather than abstaining from eating food products which are necessary to maintain life.

Some of the objects sought in appointing the commission on country life, were to ascertain how farm life might be made more attractive and more profitable, thus inducing our boys and girls to take a greater interest in agriculture and remain on the farm rather than go to the city.

Now, that some of these conditions are in part being realized, the Beef Trust and kindred combines get control of our food products, double the price to the consumer, and the farmer gets unjustly censured as a result.

The only way for farmers to remedy this evil lies in the intelligent use of the ballot. Quit sending men to our halls of legislation who are owned or controlled by the Trusts, then this illegal price raising and gambling in food products will be stopped and the producer and the consumer be brought into a closer and more friendly relationship, with unnecessary middle-men eliminated.

Recognizing the beneficial effect of the work of the School of Agriculture and Experiment Station at the Pennsylvania State College, and the effect which the work of this school would have upon the general results in the agriculture of Pennsylvania, if the College were more accessible to the people generally; therefore, be it

Resolved, That the State Board of Agriculture, in regular annual meeting assembled in the Capitol of the State, hereby memoralizes the Pennsylvania Railroad Company to add their powerful influence in the development of the agriculture of the State, and the resultant benefit to their own lines by connecting the now separated branches

of the Lewisburg and Tyrone Railroad so that there may be a continuous line from Tyrone on the main line to Montandon on the Philadelphia & Erie Road by way of the State College.

Resolved, That this Board has noted with satisfaction the disposition of the Pennsylania Railroad Company to aid in the general work of agricultural education by the distribution of instructive leaflets containing valuable farm statistics and other important information and by equipping trains to be occupied by representatives of the State College School of Agriculture and the State Department of Agriculture, thereby affording farmers adjacent to their lines the opportunity of receiving instruction upon important questions relating to scientific agriculture and of witnessing demonstrations of proper methods to be pursued in pruning, spraying and otherwise caring for fruit trees; and we further commend the company for the wisdom displayed in pursuing this policy.

AGAINST INCREASE OF POSTAGE.

WHEREAS, There is at present a proposition to increase the rates of postage on a certain class of publications, and that this class will include the Agricultural Journals, as well as many other periodicals useful in the dissemination of knowledge, the education which the rural citizen so much needs and enjoys; and

WHEREAS, The ultimate cost will be paid by the reader; therefore be it

Resolved, That we disapprove of the proposed increase of postage, and respectfully ask our representatives in Congress to use their influence and votes against the proposition; and be it further

Resolved, That we demand the establishment of a Parcels Post, believing that it would, in a measure, make up the deficit which now exists in the Post Office Department.

WHEREAS, There is a growing demand being made upon our teachers to impart agricultural instruction in our public schools; and

WHEREAS, The teachers, generally, are not qualified to teach this important branch; therefore be it

Resolved, That we commend the policy of State College in establishing a ten weeks' course during the summer months to instruct teachers in the rudiments of agriculture, and we urge our teachers to avail themselves of this opportunity.

WHEREAS, We recognize the conditions surrounding the head of this Department, and its different divisions, and fully realize the difficulties encountered in carrying out the work; therefore be it

Resolved, That we gladly commend the efficient work that is being done by the several Bureaus of the Department and pledge them our united support in every effort that tends to advance the cause of

agriculture, and ask that the next session of the Legislature grant such appropriations as will enable them to fully carry on the work in a broader, more comprehensive and extensive manner.

Recognizing the efficient work that is being done in the interest of agriculture, both at State College and in conjunction with this State Board of Agriculture; and

WHEREAS, Horticulture is rapidly becoming an important branch of agraculture; therefore be it

Resolved, That we ask that our State Legislature make such an appropriation as will enable the institution to erect and equip a suitable building wherein horticultural instruction may be imparted.

Resolved, That we commend the Governor's action in vetoing the measure providing for a State Highway between Philadelphia and Pittsburg; and reiterate our position taken one year ago, "That we are unalterably opposed to the bonding of our State for $50,000,000 or any amount for the purpose of raising revenue to build said highway."

WHEREAS, It has become necessary that the farmer should re-take the position which he once held in governmental affairs, to the end that politics may be purified and the burdens of government more equally distributed; therefore be it

Resolved, That each member of this State Board of Agriculture use his best effort to secure the nomination and election of a man from our own ranks for the high position of Governor of this great Commonwealth.

(Signed)
E. B. DORSETT,
A. P. YOUNG,
I. A. ESCHBACH,
H. C. SNAVELY,
E. J. DURNALL.

The CHAIRMAN: You have heard the Report of the Committee on Resolutions. What action will you take?

MR. DURNALL: Mr. Chairman, I move their adoption.

MR. GEARHART: I second the motion.

The motion was put and the Resolutions were unanimously adopted.

The CHAIRMAN: Are there any other reports to be made or remarks?

DEPUTY SECRETARY MARTIN: Mr. Chairman and Gentlemen: Your Secretary requests me to express his regret that a slight illness has prevented his attendance upon the sessions to-day. He also instructs me to say to the delegates and members of the Board that vouchers will be forwarded you to your homes for the amount of expenses incurred in attending this meeting of the Board. You will return these vouchers properly filled out to the office of the Depart-

ment of Agriculture and the funds will be forwarded you according to your voucher. When you pay bills, as we presume you all fully understand, take receipts for all expenses over $1.00. I should say receipts for hotel expenses, not railroad fares.

The CHAIRMAN: Is there anything further to come before this Board?

MR. HERR: It might be well to be known that these expenses will have to be sworn to, an affidavit made as to their correctness. Is that not correct?

DEPUTY SECRETARY MARTIN: There is no salary connected with this and the necessity will not exist for these vouchers to be sworn to. In cases where salaries are connected with the expenses all vouchers should be sworn to. This is not one of those cases.

The CHAIRMAN: You will notice on the program "Report of the Committee on Identification of Fruit." There has been no fruit presented and therefore there can be no report.

You will also notice on the program "Report of the Committee on Vegetables." No vegetables having been brought there can be no report from that committee.

So that brings us down to the close. Unless there is something special to offer I am ready to entertain a motion to adjourn.

MR. HERR: I move to adjourn, to meet at the call of the Secretary at the time chosen by the Deputy Secretary for the Round-up Meeting of the Farmers' Institute at Butler, Pa.

MR. DURNALL: I second the motion.

The motion was put and carried.

Whereupon the Board adjourned at 9:45 P. M.

A. B. Critchfield

Secretary.